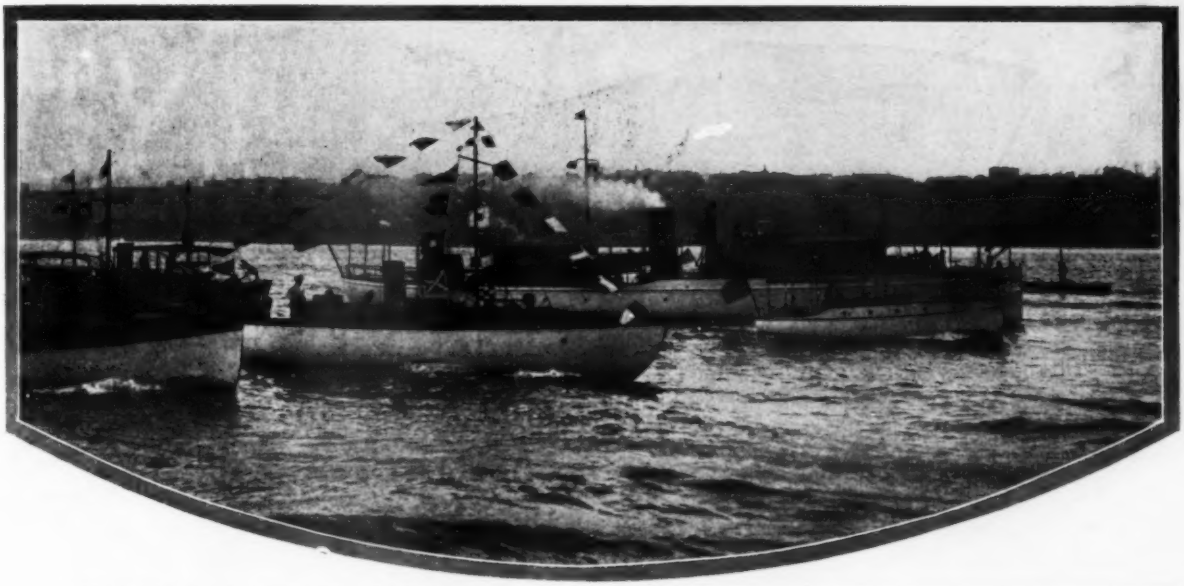


CONTENTS

for FEBRUARY *1922*

VOLUME XXIX, No. 2

The Journey's End 13-16
Racing At Miami 17
Roamer, One of the New Big Ones of the Past Season .. 18-19
Perfection in the Cruiser 20-21
Gar Jr. II As An Ice Breaker 22-23
Happy Fishing Grounds 24
Correspondence Course Comes to a Close 25
Miss Liberty at Sunset 26
Practical Hints on Small Boat Handling 27-30
The Bowline 31
Gladys, A Snappy 20-Foot Hacker Runabout 32-35
When My Ship Comes In 36
New Models of Scripps Motors 37
The Mystery of the Screw Propeller 38
Hall-Scott Equipped Boats and Their Motors 39
Small Motor Boats, Their Care, Construction and Equipment 40-42
Prize Question No. 1: Removable Glass Wind and Spray Shield 40-41
Prize Question No. 2: Motor Boat Hauling Gear 41-42
The Way We Would Do It 43
Piston Displacement of Four-Cycle American Marine Motors 44
The Newest Palmer Marine Motor 45
Motor Boatmen's Chart No. 28, New Jersey Coast Little Egg Inlet to Bayhead 46
Cruising on Barnegat Bay 47
Material Lists For Building Boats 48-49
Yard and Shop 50

Calendar of Coming Events

National Motor Boat Show, Grand Central Palace, 46th Street and Lexington Ave., New York City. Opens 8 P. M. Friday, Feb. 17. Continuous from 10:30 A. M. to 10:30 P. M. until Saturday, Feb. 25. (Not open Sunday.) Admission 75 cents. Lectures on Small Boat Handling, Piloting and Seamanship, New York Athletic Club, 59th Street and 6th Ave., New York City, Monday evenings, 8:00 to 9.45 o'clock.

No War Tax on Motor Boats Under 32 Feet in Length and Under 5 Net Tons

CONGRESS at its last session removed the yearly war tax on all boats of 32 feet in length and less, and under 5 net tons. The yearly tax on larger craft remains unchanged, namely, 32 to 50 feet, $1 per foot of overall length; 50 to 100 feet, $2 per foot of overall length; over 100 feet, $4 per foot.

The tax year is from July 1 to June 30.

Boats not placed in commission are not subject to tax. Boats in commission only part of the year must pay tax for entire year.

War Tax is payable to the Collector of Internal Revenue of the district in which the boat owner lives.

The new law does not become effective until July 1, 1922. Boats placed in commission before that date on which the war tax has not been paid for the current year will be obliged to pay a year's tax at the old rate. However, those owners who have already paid their tax for the year which began on July 1, 1921, will not be required to pay any further tax.

If a boat is either under 32 feet in length or under 5 tons net she will be untaxable after July 1, 1922. If she is, for example, 36 feet in length and 4 tons she will be tax free. If she is 30 feet in length and 10 tons net, she will also be tax free. In other words, there will be no tax on those boats which previously paid a $10 per year tax.

If a boat is both over 32 feet in length and over 5 net tons her tax rate will be according to the scale mentioned above. If she is a 36 footer of 10 tons burden, the tax will be $36 per year, that is, the tax rate will be on the overall length of the boat and not figured on an exemption of the first 32 feet of length.

The war tax on the use of boats should not be confused with the number which every undocumented boat over 16 feet in length must carry on its bow. The numbers are obtained from the Collector of Customs of the owner's home district. There is no charge for numbers and they never have to be renewed unless the boat is sold. In case a boat is sold, the transaction must be reported to the Collector of Customs. The Bureau of Navigation, Department of Commerce, Washington, D. C., has supervision over the numbering of motor boats.

THE Motor Boat Show, February 17th to February 25th, coming as it does between regular publication dates of MoTor BoatinG can be better covered in a special issue. We are planning therefore to thoroughly describe the show and all its varied exhibits in an extra and special Show Number of MoToR BoatinG to be published on the day the show opens.

This number will contain complete descriptions of all exhibits, the names of exhibitors, their location and in fact will be a complete guide to the Show.

It will be mailed to all subscribers without extra charge.

MoToR BoatinG is published monthly by the International Magazine Company, William Randolph Hearst, president; C. H. Hathaway, vice-president; Ray Long, vice-president; Joseph A. Moore, treasurer; W. G. Langdon, secretary; 119 West 40th Street, New York, N. Y., U. S. A. Single Copies, 25 cents. Yearly subscription in United States and Canada, $3.00. In foreign countries, $4.00. When you receive notice that your subscription has expired it is best to renew it at once, using the blank enclosed. When requesting a change of mailing address, give the old as well as the new one. Allow four weeks for the first copy to reach the new address. Copyright, 1922, by International Magazine Company (MoToR BoatinG).

The Lightest Outboard Motor in the World

2 Cylinders —2 H. P.

Why Motor Boat Owners Prefer the JOHNSON

The Johnson Lightweight 2 Cylinder 2 H. P. Motor has an irresistible appeal for all lovers of water sports. So much speed and power has never before been put up in such a small package. Think of it! Weighs—

Only 35 Pounds Complete

Easy to carry anywhere. Yet drop the "Johnson Twin" over the stern of any row boat or canoe and quietly, easily, speedily you plow through the water. There is not one needless pound to drag. Johnson has increased power and greatly lessened weight solely through better designing, finer workmanship and more modern materials. Johnson Engineers built the first V type multiple cylinder marine and aeronautical motor—the first American monoplane and the first motor successful in driving a bicycle as an attachment. Now they have made the outboard motor almost as convenient to carry as a pair of oars and as dependable and durable as the finest designed power boat engine.

Every Johnson OutboardMotor is absolutely guaranteed to perform satisfactorily as claimed and to be free from all defects in material and workmanship

Ten Other Features You'll Like About the Light Weight Johnson

We equip the "Johnson Twin" with a real "Quick Action" Magneto and a real Carburetor. There are no batteries to renew or to carry. There is no bothersome mixing valve. Just an easy pull on a simple cord starter spins the motor at top speed. The hot spark from the Quick Action Magneto, the convenient choke and the perfect mixture delivered by the float feed carburetor insure a quick, easy start. Spark and throttle control like auto gives you any speed you want. Automatic self-tilting feature and protecting skeg carries you safely over logs, sandbars or other hidden obstacles. Quick reverse feature enables you to stop boat at full speed in half its own length. The twin cylinders firing simultaneously greatly reduce vibration. Have same number of power explosions per revolution as a 4-cylinder automobile engine, making the Johnson the smoothest, quietest motor on the water. The Johnson is clean to handle and operate. There are no dripping grease cups or oil cups. Motor can be taken apart easily at one joint for carrying in case. Beautifully finished in polished aluminum and nickel. Free Illustrated Catalog Folder just out fully describes this marvelous new lightweight motor. Write for it today. ***The Johnson Agency is a real proposition for live dealers.***

JOHNSON MOTOR CO. 860 Sample St., South Bend, Ind.

Johnson
OUTBOARD MOTOR

"Built on the Banks of the St. Joe"

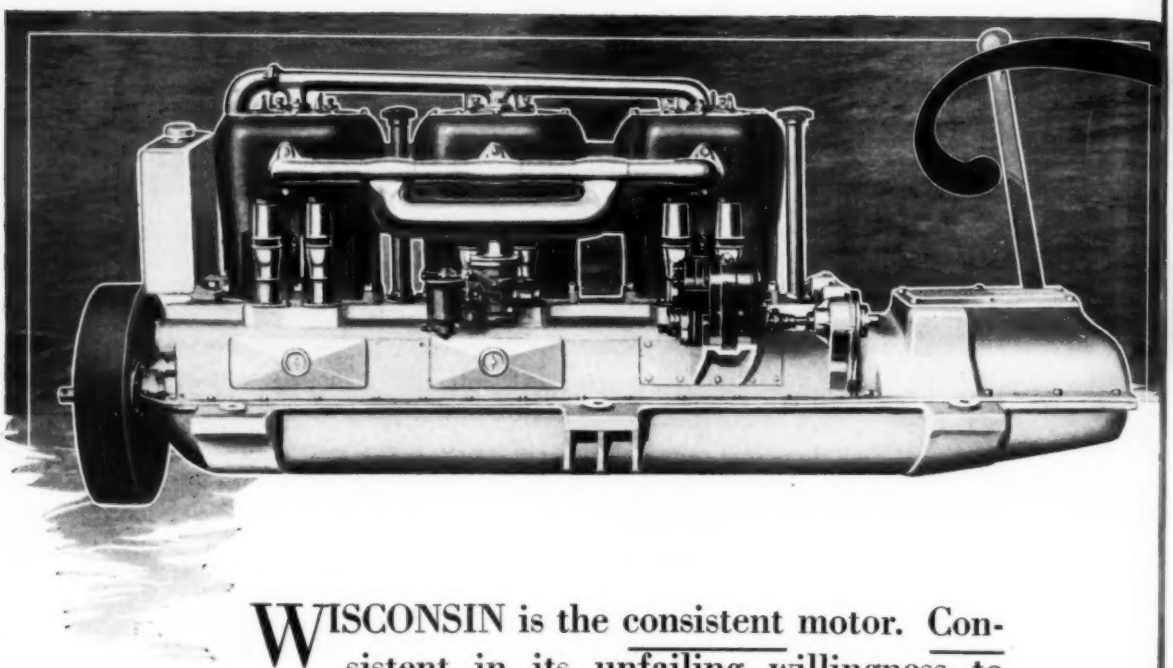
Advertising Index will be found on page 192

Wisconsin

Consistent

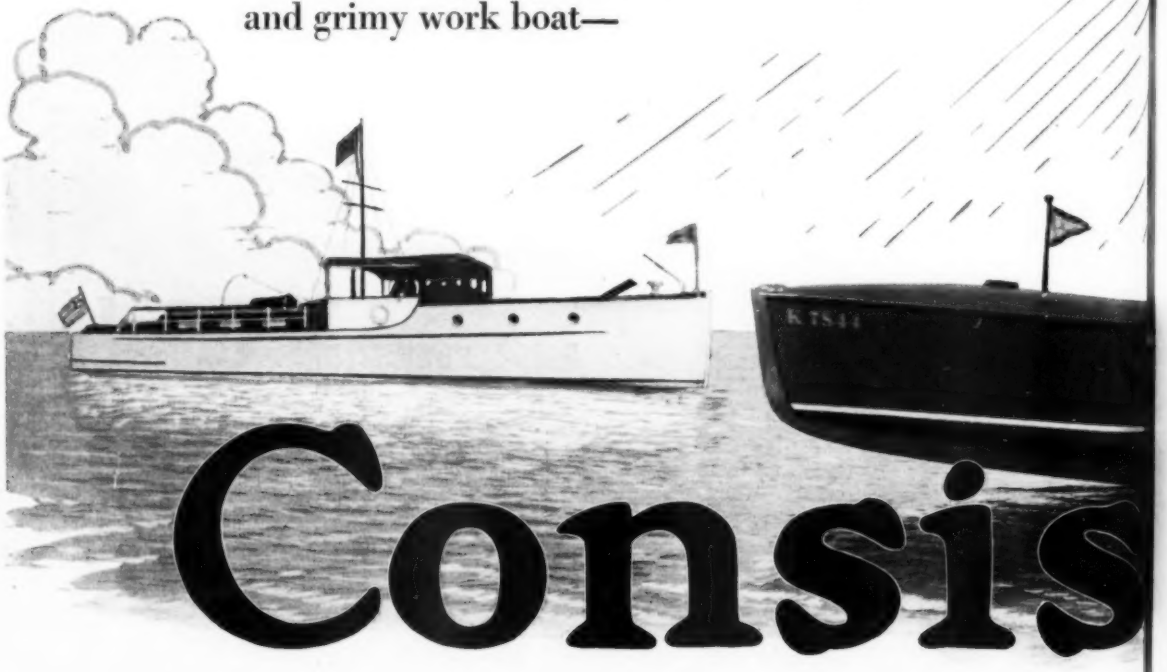
WITH your new boat—all the skill of the foremost designers, all the combined craftsmanship of famous builders—could not compensate for inferior performance in your motor. Each year, motor performance measures the worth of your boat, from the time it takes the water, straight through the succession of afternoon runs and week-end trips and longer cruises, until you haul out in the fall—

Visit the Wisconsin exhibit in space B-7, New York National Motor Boat Show, February 17th to 25th



WISCONSIN is the consistent motor. Consistent in its unfailing willingness to start running and keep running until stopped. Consistent whether its duty calls simply for trouble-free service, or for unfaltering performance under downright abusive conditions. Consistent throughout is the record of its many years of widespread use in every type of power craft, from speedy runabout to husky cruiser and grimy work boat—

Visit the Wisconsin exhibit in space B-7, New York National Motor Boat Show, February 17th to 25th



Consis

Advertising Index will be found on page 192

Wisconsin

Consistent

ONE word—"consistent"—is the true measure of satisfactory motor performance. It is the summed-up, one-word story of powerful, dependable service—year after year—in squall or calm or gale. Briefly it words all the praise you can give a motor, all the pride of ownership you can express. And wherever boats are moored and yachtsmen gather, "consistent" is inseparably associated with Wisconsin Motors!

Visit the Wisconsin exhibit in space B-7, New York National Motor Boat Show, February 17th to 25th

tent

Wisconsin

Consistent

IF you are building a new boat, or installing a new motor in your present boat, get full facts on the Wisconsin. Learn its record for *consistency*. Listen to the opinions of other yachtsmen, to the testimony of Wisconsin owners. Visit the Wisconsin exhibit at the show.

Wisconsin Motor Mfg. Co.

MILWAUKEE WISCONSIN

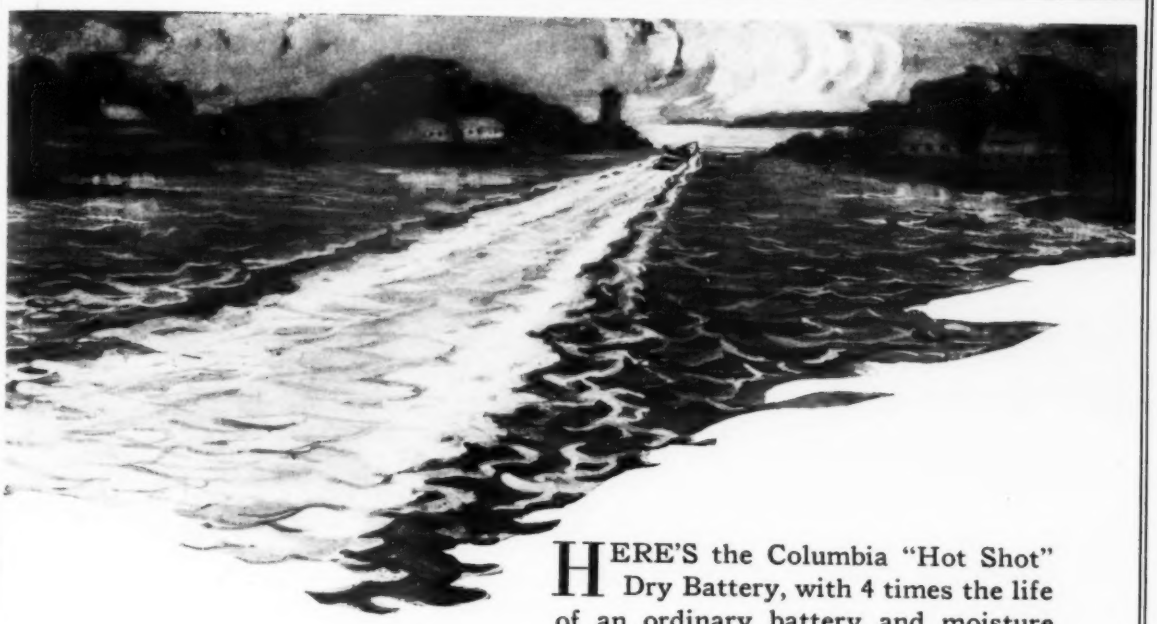
Visit the Wisconsin exhibit in space B-7, New York National Motor Boat Show, February 17th to 25th

Distributors:

New York Office: 21 Park Row, New York, N. Y.
Wisconsin Motor Parts Co., 2354 Cottage Grove Ave., Chicago
Earl P. Cooper Co., Los Angeles, California
Chandler Hudson Co., Seattle, Washington

Consistent

Advertising Index will be found on page 192



HERE'S the Columbia "Hot Shot" Dry Battery, with 4 times the life of an ordinary battery and moisture proof.

A spark that snaps—zips up an engine—makes lazy gas work. Perfect ignition.

A Single Dry Battery of 4 Cellpower—Moisture Proof—Only 2 Binding Posts, and They're Perfectly Insulated

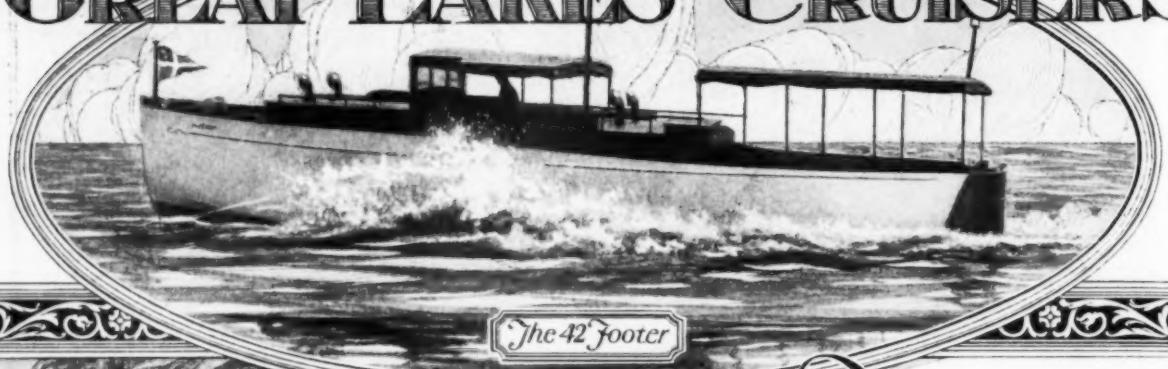
Not a thing to keep in running order—not a spot to protect from rust—not a connector to work loose and break the circuit.

Ask your dealer today for a Columbia "Hot Shot" for your ignition — and you'll order another soon for your lights.

NATIONAL CARBON COMPANY
Incorporated
Cleveland, Ohio San Francisco, Calif.
Canadian National Carbon Co., Limited, Toronto, Canada

Columbia Dry Batteries
—they last longer

GREAT LAKES CRUISERS



The 42 Footer

The Spell of the Tropics

PROMPT DELIVERY

42-Ft. Standardized Express Cruiser

54-Ft. Standardized Express Cruiser

NOW is the time to order one of these models for use in Florida or for Spring delivery.

To meet the demand for a moderate size cruiser having excellent accommodations for extended and day runs, we offer the 42-footer with a turn of speed of 23 miles an hour.

The 54-footer fills perfectly the desire for a larger cruiser possessing the utmost in luxurious accommodations, seaworthiness and a speed of 25 miles an hour.

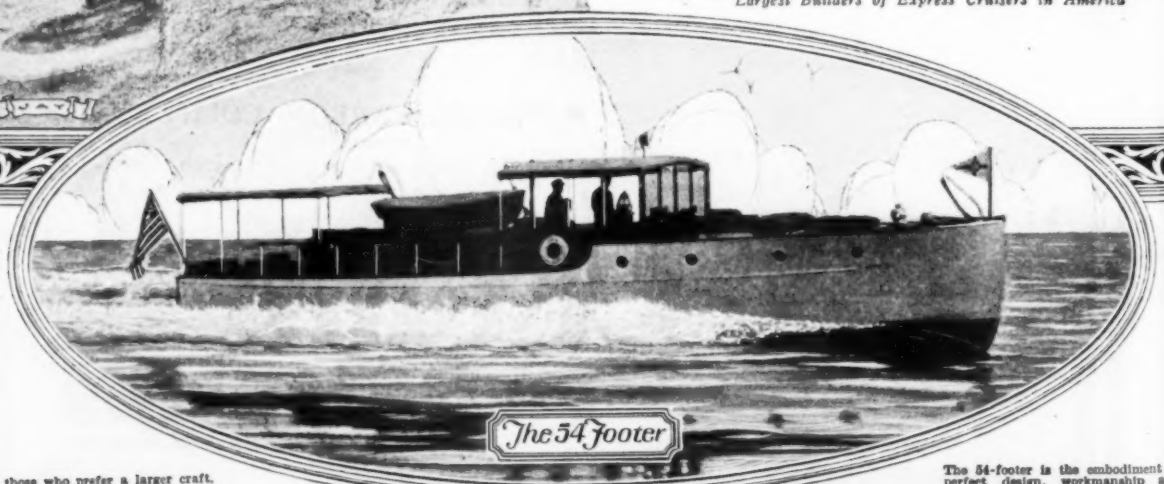
Shipment can be made by rail to any port.

Send for our latest bulletin, No. 208 on the 42-footer, and No. 337 on the 54-footer.

Great Lakes Boat Building Corp.

MILWAUKEE **WISCONSIN**

Largest Builders of Express Cruisers in America



The 54 Footer

For those who prefer a larger craft, we offer the 54-foot twin-screw express cruiser — a standardized cruiser of established merit.

The 54-footer is the embodiment of perfect design, workmanship and quality. It is a 20-mile express cruiser with real accommodations.

Advertising Index will be found on page 192

MOTOR BOATING

119 West 40th St., New York, N. Y.

Her voyage over, Hippocampus is seen anchored off the Balboa Boat House, at the Pacific end of the Panama Canal. The sloop in the foreground was hauled out by the simple process of waiting for the 16-foot tide to drop

The Journey's End

Hippocampus, Passing Through the Panama Canal, Establishes a Double Record—She Salutes the Pacific and Then Goes Out of Commission at Gatun Awaiting Next Year's Cruise

By Alfred F. Loomis

HIPPOCAMPUS has successfully completed the first leg of her long voyage to the Pacific. Mr. Loomis, who has now become affectionately known as Admiral Loomis, has accomplished what many at the outset forecast would be a failure and might possibly result in disaster.

You all remember the preliminaries—starting from New York on May 1 in the 28-foot yawl Hippocampus, which is powered with a little 10 horsepower Palmer motor and with absolutely no training or experience in the art of sailing he has made the voyage to Panama without being shipwrecked or even losing a sea anchor or a shroud. It's a fine example of what can be done in a small boat, without undue hardship, by an inexperienced, yet careful crew.

Mr. Loomis' stories have been enjoyed by thousands of motor boatmen. While this is the last article in the present series yet it does not mean that Mr. Loomis will not continue to write for MoToR BoatinG. In the next several issues he will write articles dealing with the navigation problems and difficulties which he met and solved en route. Mr. Loomis will then return to Panama and continue his cruise on Hippocampus.—Editor.

HAVING been open to the deep sea traffic of the world for a matter of five years, the Panama Canal is blasé. Battleships which possess the power to thrill the least emotional of souls pass through it, and the pelicans, sitting on the bleached branches of trees rising from the bottom of Gatun Lake, shrug contemptuous shoulders. Twice a month the tremendous emergency gates at the Gatun Locks are experimentally closed, to the wonder and admiration of all visitors who are mechanically minded, but the Hebraic little frogs of the dam pay them no attention. Unperturbed they croak their guttural Oy, Oy, Oy—a sound that, even more than the songs of the cabaret girls in Colon, reminds me of little old New York. Ships from Shanghai, Cape Town, Liverpool, pass from ocean to ocean in a day, and the lock engineers, unamazed, repair to the carpenter shop between the lock chambers and pursue their interrupted craftsmanship in fine native woods.

The whole Canal Zone is so scaled up to the operation of tremendous works that the unusual in point of size, intricacy, or ingenuity has become usual. Conversely, the small ship or the minor undertaking has become interesting. Hence it was that the "Star and Gizzard," less affectionately known as *The Star and Herald*, of Panama City, singled out Hippocampus for a column of glowing praise. From this news story we learned that our 28-foot yawl is the smallest boat ever to pass through the canal on a long cruise.

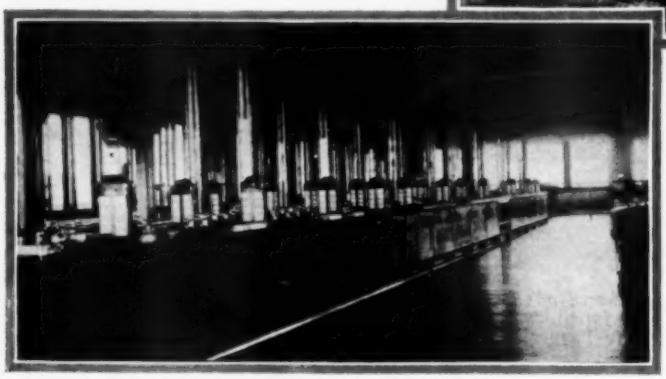
Gratifying as it was to know that our diminutive proportions had established a record in the annals of the canal, we were still more pleased by a special concession that was accorded us by the authorities. Having cruised from New York without once taking a pilot, and having

at times navigated difficult places without adequate charts, we entertained an ambition to pass through the most meticulously piloted waterway in the world without a professional hand at our tiller.

We disclosed our desire to the port captain at Colon and learned that it was unusual, untenable, and preposterous. No ship, we were told, other than a Government vessel, had ever passed through the canal without a pilot; no ship was permitted to move even from anchorage to dock without one. It was not that we were incapable of passing through without a pilot—our wish was contrary to the rules and regulations governing the canal. Severe as it seems, this ultimatum was couched in friendly phrases, and we took heart.

"Very well," we replied, in effect, "why not abrogate the rules? What are rules for if you can't break 'em?" And we

Natives unloading bananas at the lighthouse depot dock at Gatun, where Hippocampus went out of commission

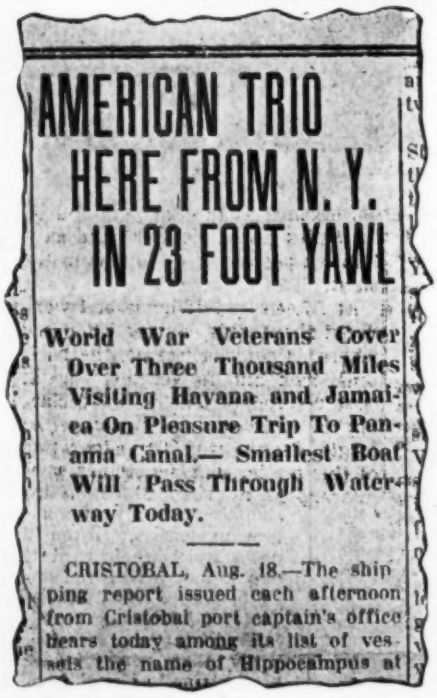


Control board of the Gatun locks, which reproduces in miniature the functioning of the gigantic gates

presented a few telling facts and figures. By official measurement Hippocampus is of six tons gross weight; by official classification she is a vessel in ballast and is chargeable at seventy-five cents a ton, or $4.50 for the passage. This sum includes the services of the pilot. The pilot's hire would nick the Government $14. Problem—find the Government's percentage of profit.

This presentation of statistics won the case for us, and, following our assurance that we were able to differentiate between red and black buoys, we received permission to proceed at will from Cristobal to Balboa.

On the morning of August 19th we got under way from our anchorage, and with E. G. Davidson, a mining engineer, aboard, swung into the channel leading to the Gatun Locks. With us, as we approached the giant's stairway, steamed the S.S. Arapehu, bound from England to New Zealand, and her passengers, lining the rail, watched us with interest as we lowered our brilliant yacht ensign and in its stead hoisted a dingy, time-worn remnant of a United States ensign. They did not know, of course, that this flag, once brave and

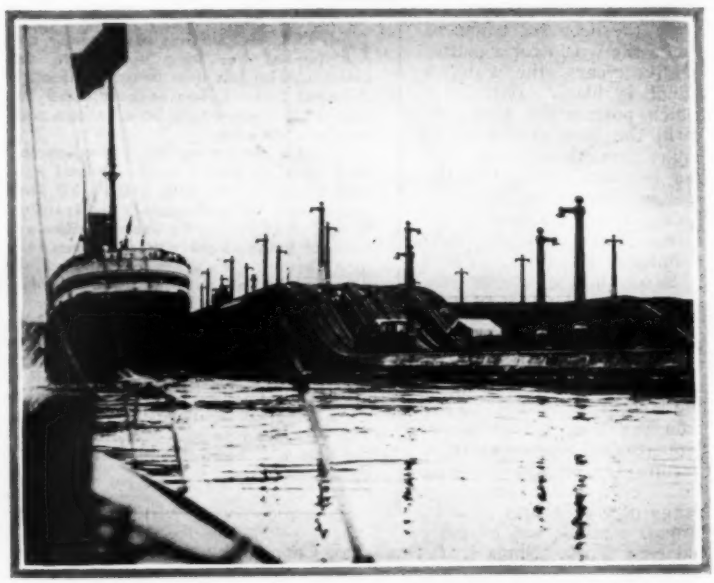


AMERICAN TRIO HERE FROM N. Y. IN 23 FOOT YAWL

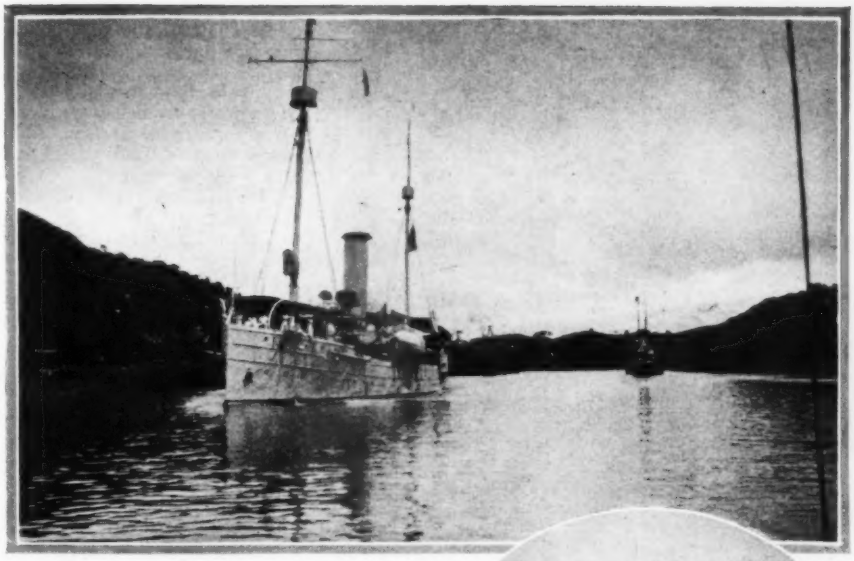
World War Veterans Cover Over Three Thousand Miles Visiting Havana and Jamaica On Pleasure Trip To Panama Canal.— Smallest Boat Will Pass Through Waterway Today.

CRISTOBAL, Aug. 18.—The shipping report issued each afternoon from Cristobal port captain's office bears today among its list of vessels the name of Hippocampus at

The "Star and Herald" of Panama City greets Hippocampus, mentioning her waterline length



A New Zealand steamship locks through with Hippocampus at Gatun. Note the electric "mules" on the cogged towing track



American cruiser about to pass Hippo at the approach to Culebra Cut

bright, had spread its stripes in the Adriatic submarine zone, and had been brought to Panama to enrich its sentimental value; but from the studied nonchalance of the crew of Hippocampus they may have guessed that the occasion was one of great moment to us.

To say the least of it, one doesn't enter a thousand-foot lock in a 28-foot yawl with a calm, untroubled mind. We knew that the incoming water would surge up under us from sixteen-foot culverts, and we had been told often enough of the damage resulting to small boats. Some had had their rails and rubstreaks ripped away, and even Navy tugs had been torn from their moorings and whipped about in the lock chambers. As we waited for the Arapehu to enter the first lock ahead of us we felt that crossing the open Caribbean was child's play compared with this adventure.

Nevertheless, as I say, we were nonchalant. Under power we crept up near the stern of the ocean liner and lay to alongside the left wall of the lock chamber. Heaving lines were dropped on to our awning from above, and when we observed their slightness we politely but firmly asked for heavier stock. The ponderous gates were closing, time pressed, but new lines of three-quarter-inch diameter were soon forthcoming. The upper ends were secured to bollards forty feet above us and we were advised to take a turn with each around our bitts and prepare to haul in slack. It sounded simple in prospect.

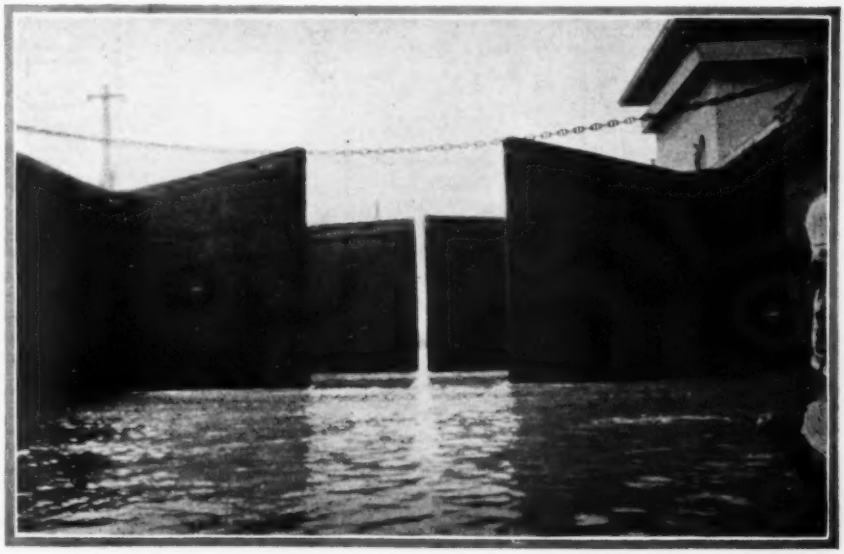
With the first inrush of water —an influx, by the way, a dozen times more tumultuous than the admission of water to the locks in the New York barge canal— we were thrown violently against the wall, and there we stayed, chewing away our rubstreak, for the first fifteen feet of the thirty-foot rise. But presently a violent counter current caught our stern, and try as Al and Davidson, manning the sternline, would, they could not hold us close to the wall. This was an exciting two minutes, but suddenly the current slacked off, and we floated as placidly as a celluloid duck in a bathtub. One-third of the agony was over.

The next third was the worst, for there is something inexplicable about the middle lock at each end of the canal that plays hob with the currents and with the small craft caught in their rough embrace. Even capital ships have trouble in the second lock, and we have heard of iron chocks and yards of hand railing being hurled high in air when the electric "mules" curb the unruly plunges of their charges.

Part of the banana crop arrives in a cayuca from the Panamanian jungle

This time as the huge gates closed majestically behind us we lost some of our nonchalance, and I for one felt somewhat as Poe's character felt when he looked up from his cot and saw the walls of his dungeon drawing together. We had started the motor to convey us to the upper level, but now we shut it off and stood on deck ready to pull or push. Joe Chambers and Davidson were again at the after line and Joe Squibb at the less troublesome bow line, while I stood by prepared to soften the first crash of the boat against the stone coping.

The crash came as the water eddied up, and again the



The emergency collision chain and the huge lock gates of Miraflores, at the Pacific end of the Canal. Compare their size with the figure of the man in the upper right-hand corner

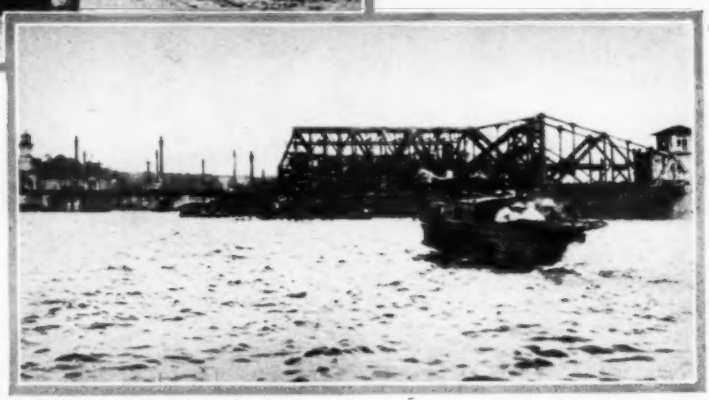
Market day at Panama City—native boats beached for the sale of local produce

splinters flew. For a moment we hugged the wall, Chambers and Davidson taking slack feverishly, and then again the current caught our stern and robbed us of the slack. The line hauled taut and we surged forward. There was no heaving against that urge. Instead, as the water rose, the angle of the humming line increased from the perpendicular, and in a moment we were irresistibly thrust stern first toward the center of the chamber. The turnbuckle of the after mizzen shroud snapped as the line tended against it. The bitt started slightly from the deck.

"Pay out slowly," I advised—"let the current take us." For I feared that a parted line would throw us under the stern of the Arapehu. And with one turn around the bitt, the steaming line snaked slowly through the aching hands of the two men. Now we lay at right angles to the wall, and now as I ran forward to fend us off, we splintered the tip of our bowsprit against the unyielding stone. In another moment Chambers cast off the stern line, for it was threatening to carry away all our portside rigging—but at that instant the current slacked off and we floated gently, starboard side to the wall.

Not too gently, however, and of course the dink interposed itself between us and the stone. There came a cry from the quarter deck of our lock mate, and Al, seeming to anticipate the warning, yanked the tender from harm's way by a margin of inches. We eased Hippo's shock of impact and breathed again.

Likewise we cast off our remaining line, started the motor, turned around in the lock and followed the Arapehu into the third and topmost chamber. As we took our mooring lines from the lock tenders on the lake level we received a word of encouragement.



Ben, a mahogany cruiser built by Captain Healy at Gatun, from MoToR BoatinG's *design. The emergency gates show in the background*

"You're through the worst of it," said Walker, an official who later showed us through the operating galleries of Gatun, "and if you'll haul aft a bit to lie directly abreast the ladder you'll have no further trouble."

We did as we were advised, and found when the water was admitted that we had been placed directly above one of the big inlet culverts. The effect was somewhat similar to that of a ball sustained in air on the powerful jet of a fountain, for the current, rising perpendicularly beneath us, divided fore and aft and kept us in slack water.

Hippocampus, at her mooring in Gatun, wears the air of one who gives as good as she receives

In this lock I replaced Al at the stern-line, for his hands were raw from his experience, but had little to do but take in slack as we ascended. In one hour and nine minutes from the time of entering the lowest lock we were in the fresh water of Gatun Lake, but little the worse for rough usage, and with the last major excitement of the cruise behind us.

The New Zealander was towed from the chamber by her six electric locomotives, and as she cast off her steel cables, we started our motor and, dodging the back wash from her propeller, headed blithely for the dock of the canal lighthouse depot. There we were welcomed by F. W. Kariger, pilot in charge of lighthouses, and there inspected the motor boat Eunice, which, as I mentioned in the last number, figured expensively in the canal passage of the Dream Ship.

Eunice is chiefly interesting to northern eyes in her deck of solid teak. We are used to this tropical wood in the ornamentation of expensive yachts, and consider it bordering on the sacrilegious to employ it for the deck of a work boat. Yet Kariger told me that for five years the hobnailed shoes of Negro deck hands,

(*Continued on page* 168)

Photograph by M. Rosenfeld

Where it's June all the time. A glimpse of the garden spot of America where the motor boat never has to go out of commission

Racing at Miami

Plans Completed for Events for All Types of Boats—Racing in February and March Under Sunny Skies and June Weather

IT'S June in Miami and the stage is all set for what promises to be the most successful series of winter motor boat races ever held. Out at Los Angeles, Cal., this fall and winter, the yachtsmen of the Los Angeles Athletic Club have been holding a series of motor boat races principally for the hydroplane type of boat. Now Miami and Miami Beach enter the arena, where from Feb. 18 to March 9, motor boat racing will be held almost continuously.

Carl G. Fisher of Indianapolis and Miami Beach, the man who has done more than any other for high class motor boat racing and for the development of the real runabout, is again at the helm. However, this year he has gathered about him as his assistants and for the race officials the greatest array of motor boating talent which has ever been brought together. No section of the country is overlooked or not represented by at least one prominent racing man on the committee. All of these have promised to be at Miami Beach during the regatta and to assist in boosting the sport.

PROGRAM OF A. P. B. A. SOUTHERN RACES, MIAMI, FLA.

Express Cruiser Race, Saturday, Feb. 18, Start 9 A. M., Miami to Palm Beach and return.
Express Cruiser Race, Tuesday, Feb. 21, Start 7 A. M., Miami to Havana.
Express Cruiser Race, Saturday, Feb. 25, Havana to Key West.
Express Cruiser Race, Sunday, Feb. 26, Key West to Miami.
Thursday, March 2, Start 1:30 P. M., Flamingo Course, 10 miles, Chance Race, open to boats of all types and sizes.
Thursday and Friday, March 2 and 3, Start 3 P. M., Flamingo Course, race for the Fisher-Allison Trophy, 50-mile heats. Open to displacement runabouts powered with marine motors not exceeding 3,000 cubic inches piston displacement.
Friday, March, 3, Start 2 P. M., Flamingo Course, Free For All Runabout Race, 20 miles, open to all runabouts except those competing in Fisher-Allison and Wood-Fisher events.
Saturday, March 4, Start 2 P. M., Ocean Course, 20-mile race for express cruisers.
Saturday, March 4, Start 2:10 P. M., Ocean Course, 10-mile race, for cruisers having the speed of less than 20 miles per hour.
Saturday, March 4, Start 3 P. M., Ocean Course, third heat for Fisher-Allison Trophy, 50 miles.
Tuesday, Wednesday and Thursday, March 7, 8 and 9, Start 1:30 P. M., Flamingo Course, Handicap Cruiser Races, 3 heats—ten miles each day. Open to cruisers of all types.
Tuesday, Wednesday and Thursday, March 7, 8 and 9, Start 3 P. M., Wood-Fisher Trophy Races, Flamingo Course, three heats, 50 miles each. Open to displacement boats of over 32 feet in length, powered with motors not exceeding 2,250 cubic inches piston displacement.

Starts of the Ocean Races will be off the Fisher Pier, opposite Lincoln Road, Miami Beach

Starts of the races held on the Flamingo Course will be off 10th St., Miami Beach

Commodore A. A. Schantz, of Detroit, who has been responsible for many successful Gold Cup events in his home town, assumes for the first time general supervision over the races. Assisting Commodore Schantz are such prominent racing men as Gar Wood and C. W. Kotcher, both of Detroit, Mich., and C. F. Chapman of New York.

Commodore A. I. McLeod, of Algonac, Mich., will act as chairman of the Judges Committee. Associated with Commodore McLeod is A. J. Groesbeck, Governor of Michigan, and the following officials: O. J. Mulford, Detroit, Mich.; J. A. Allison, Miami Beach, Fla., and Indianapolis, Ind.; Harry C. Stutz, Indianapolis, Ind.; Huston Wyeth, Miami, Fla.; Caleb Bragg, New York City; Edsel Ford, Detroit, Mich.; W. C. Morehead, Milwaukee, Wis.; Webb Jay, Chicago, Ill., and Little River, Fla.; C. G. Amory, New York City; C. A. Criqui, Buffalo, N. Y.; S. B. Eagan, Buffalo, N. Y.; Humphrey Birge, Buffalo, N. Y.; F. C. Ericson, Toronto, Canada;

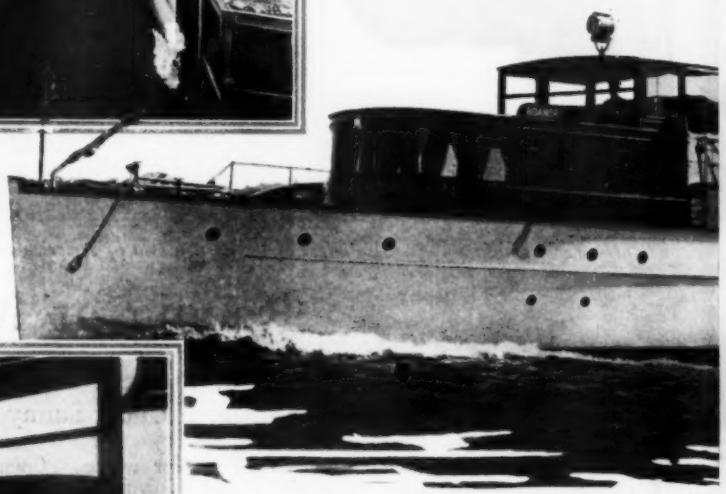
(*Continued on page* 170)

Photographs by F. G. Spencer, Jr.

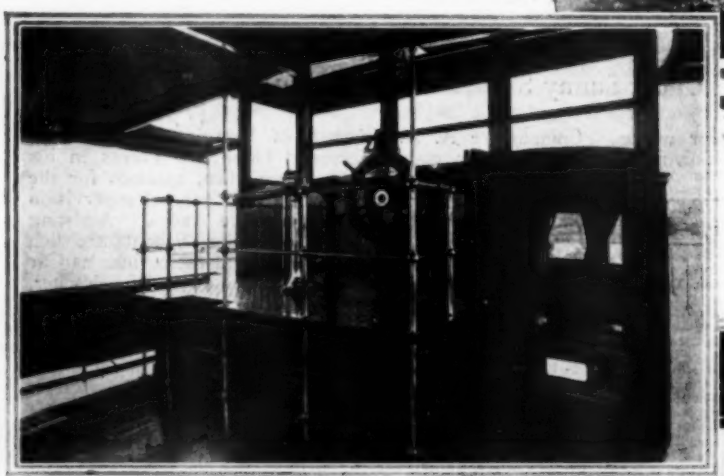
Roamer, One Ones of the

An Attractive New Yacht Special Consideration for

Interior of main saloon looking aft



AMONG the new yachts of the past season is Roamer, designed and built by Frederick S. Nock at his yard at East Greenwich, Rhode Island, for A. Albert Sack, Jr., of Providence. This boat is 93 feet in length and 15-foot beam. Her construction is unusually heavy, part of the frames being double sawn, while others are steam bent. The planking is double and in long lengths of Port Orford cedar. Timbers for longitudinals and engine girders are also very heavy and of oak in long lengths.



The steersman's position on the bridge-deck

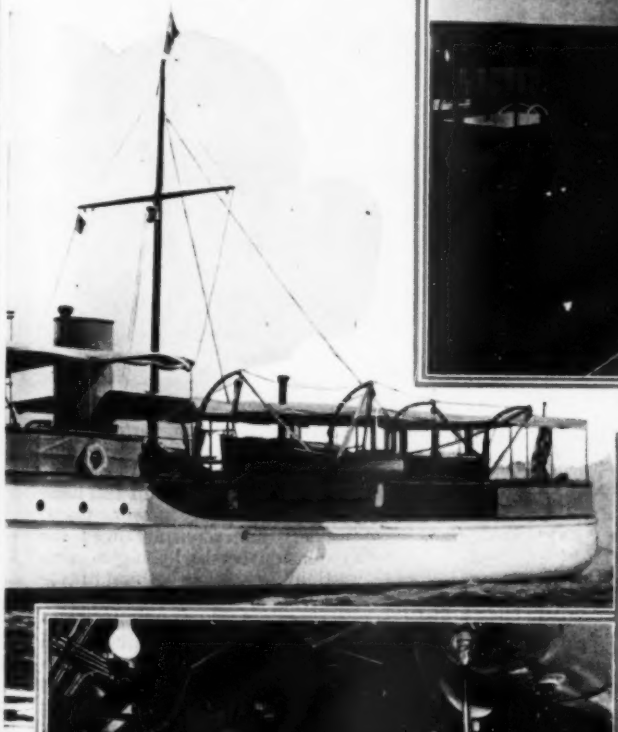
Water-tight bulkheads, provided at both ends of the engine room, completely isolate this compartment as well as the fore peak and the lazarette at the stern. These bulkheads are double diagonal planked and again covered on the sides towards the owner's quarters. In building the boat no restrictions were placed on the structural members and weight of parts was not allowed to interfere in the choice. As a result the boat is very substantial and no trace of vibration is perceptible when both engines and the generating set are in operation.

Quarters for the crew are located forward and comprise lockers, berths, and mess fa-

View along the deck line, looking aft

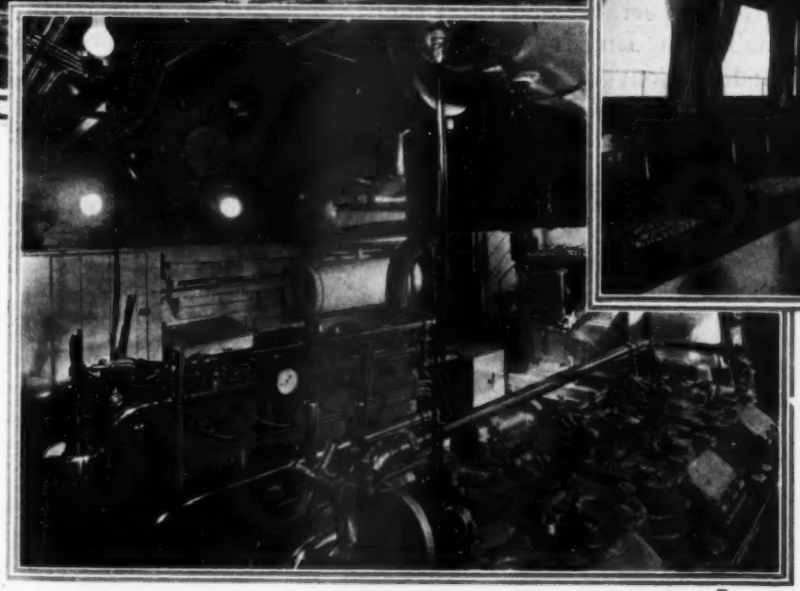
of the New Big Past Season

Carefully Planned With the Owner's Requirements



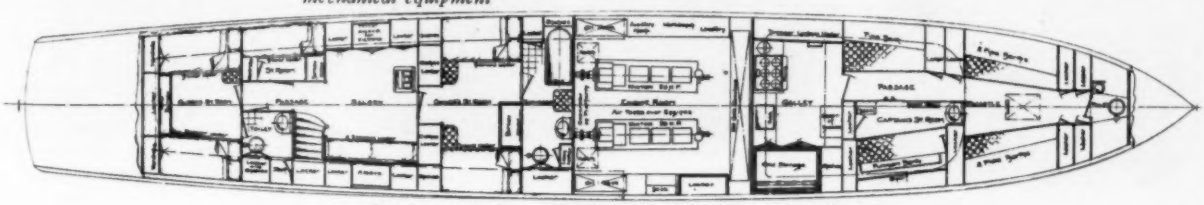
Main saloon looking forward, note the Victrola niche

The dining saloon is in the deck house forward

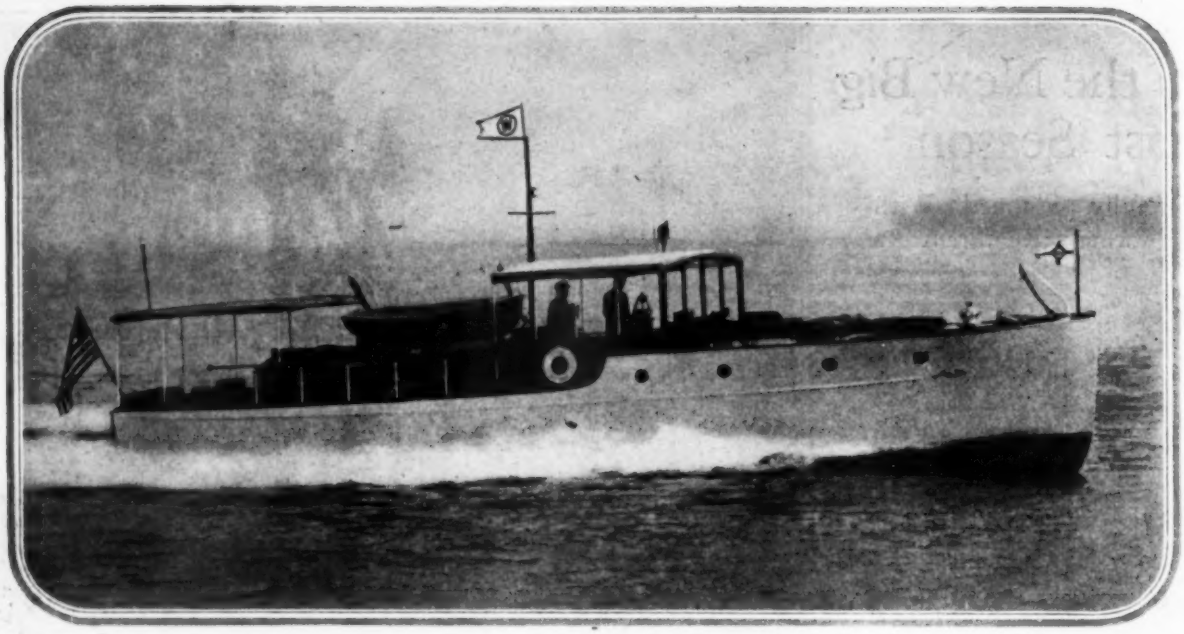


Two Winton gasoline motors and a 7½ k.w. Winton generating set comprise the mechanical equipment

cilities. A stateroom is provided for the captain in which all comforts are provided. The galley is large and commodious just aft of the crew's quarters and contains an unusually large refrigerator equipped with a Kelvinator and all necessary appurtenances. The engine room houses two big Winton gasoline engines of 6 cylinders each which are rated at 80 h.p.



Arrangement plan of Roamer, the 93-foot motor yacht



I O U, the newest Great Lakes cruiser, at full speed

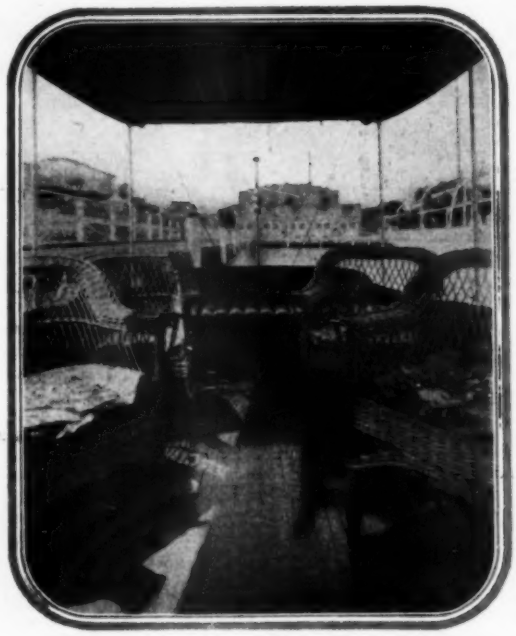
Perfection in the Cruiser

Attractive Appearance and the Utmost Obtainable in Luxury Characterize the Modern Conveniences of the High Speed Cruiser

ASIDE from seaworthiness and a good turn of speed, the most important problem which confronts the designer in the development of an express cruiser is the utilization and distribution of space. The trend of the times is toward a one-man-controlled cruiser of moderate size that offers comfortable accommodations for the owner, guests and crew, both by day and by night. If too much of the space is devoted to cabins for sleeping accommodations, then cruising by day becomes very uncomfortable on account of lack of deck space. On the other hand, if the cockpit or flush deck aft, together with the bridge, are made too large, then there is a lack of sleeping accommodations for extended cruising.

A new express cruiser, a 54-footer, has just been delivered to F. Caldwell Walker, of Detroit, by the Great Lakes Boat Building Corporation, Milwaukee, that, without question, reflects a perfect sense of proportion in the distribution of space as between the cabins and decks, as shown in the photographs herewith. Sleeping accommodations are provided for a party of eight and a crew of two for extended cruising, and most comfortable lounging space is made available by day on the bridge and in the cockpit.

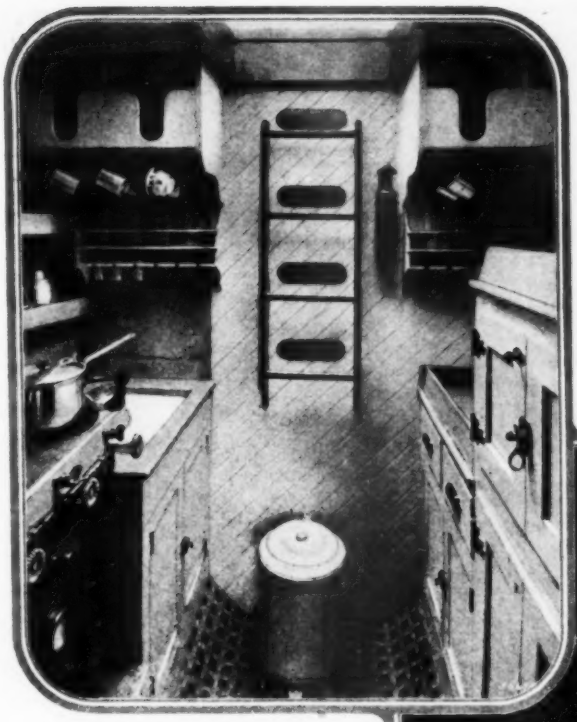
The arrangement plan provides for crew's quarters for two forward, with their own lavatory facilities; followed by galley completely equipped in every respect; main cabin with seat berths which form uppers and lowers by night, with adjoining toilet, bridge deck, engine compartment with full head room over the power plant, owner's stateroom arranged for extension berths by night, with adjoining shower bath and lavatory, and a very large roomy cockpit. Aside from the sleeping accommodations for four in each cabin, the large athwartship seat on the bridge extends to form a most comfortable bed. The seat berths are made up of seven-eighths-inch box spring construction, filled with hair and upholstered in imported broadcloth, so that not only is a very striking appearance obtained, but also great comfort.



The spacious afterdeck of the newest cruiser

In a sense, the boat is designed around the engine compartment, wherein full head room over the power plants is made available, as well as light and ventilation. All the controls are carried to the bridge deck for one man operation, including electric starter, spark and throttle, clutch, instruments, wheel, compass, chart case and searchlight.

Every conceivable comfort and convenience are to be found in Mr. Walker's cruiser. For the first time there has been incorporated in a 54-footer a complete, workable shower bath, operating on both hot and cold water. The shower and lavatory compartment for the owner's stateroom extends the entire beam of the boat. There is a constant pressure of twenty pounds on both the hot and cold



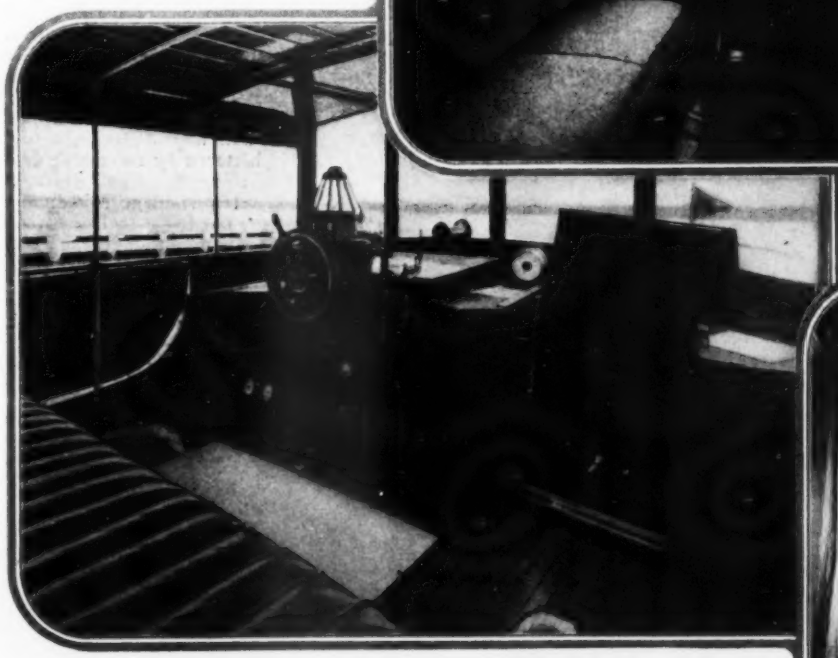
The galley, located forward, is equipped for every culinary need

partment. A small electric driven vacuum cleaner is used to good advantage in getting the dust out of the corners.

Aside from the modern conveniences that are furnished, the cruiser throughout reflects the utmost obtainable in luxury and attractive appearance. The interiors are done in mahogany and the seats upholstered in broadcloth, and the floors covered with Wilton carpet. The boat is painted with white sides and buff decks, and the bridge deck and cockpit floors are finished natural. The seats on the bridge and cockpit are upholstered in genuine Spanish leather.

The I O U, as this boat is named, is powered with two six-cylinder GR Sterling engines, which give her a turn of speed of 26-28 miles an hour, which is most remarkable in view of the fact that the boat is built very heavily throughout and has a total displacement of 30,000 pounds. Gasoline capacity is provided to the extent of 400 gallons, which gives an extended cruising radius. There is also furnished a 100-gallon fresh water tank which affords an ample supply of water for extended cruising.

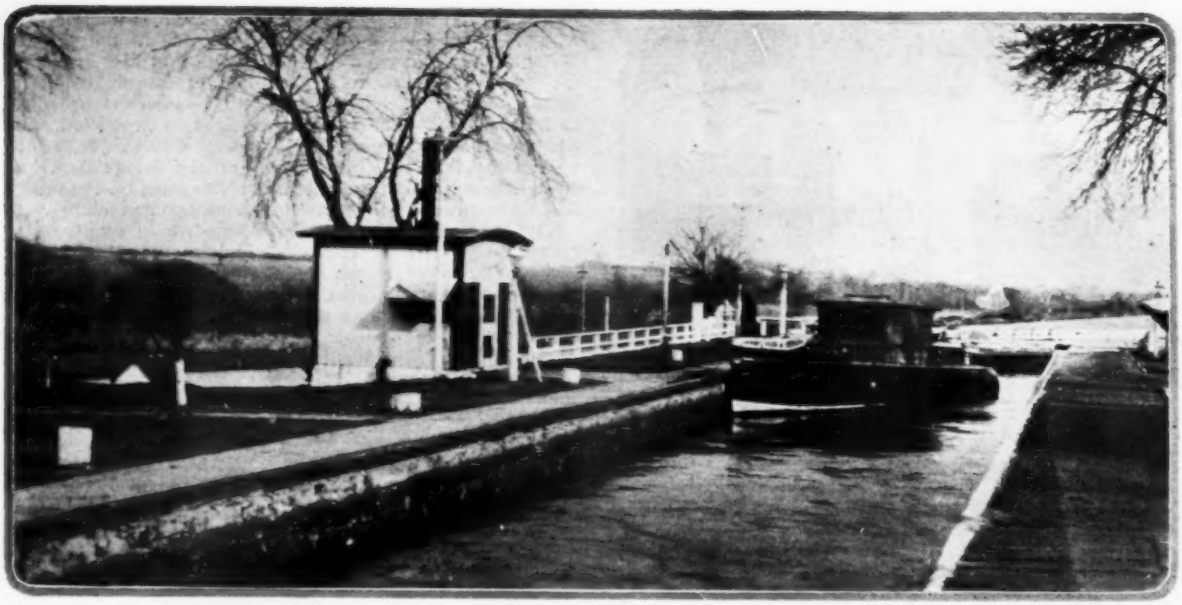
The after end of the main saloon shows the comfortable berths



The bridge deck forward is the center of the ship's control

A complete shower bath has been fitted with both hot and cold water

water system, maintained by an automatic electric driven pump. The hot and cold water is not only piped to the shower bath, but also to all of the lavatories. A separate five-gallon tank is provided for drinking water, which is piped through the refrigerator in the galley to a readily accessible faucet. Electric lights and fans are installed throughout, operated from a storage battery and independent water cooled electric light plant in the engine com-



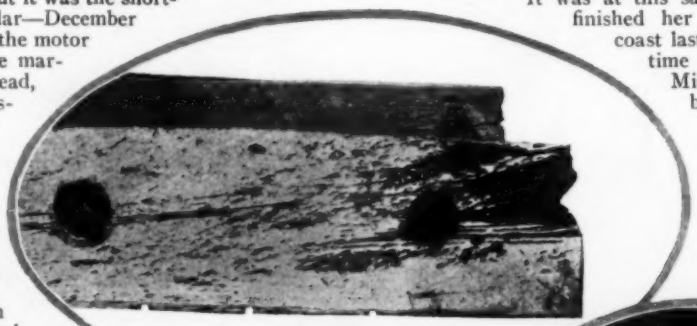
A glimpse of Gas Jr. II on the Chesapeake and Delaware Canal on December 21, 1921

Gar Jr. II As An Ice Breaker

Famous Cruiser Shows She Has No Greater Fears for the North's Frozen Canals Than for the Atlantic's Storms or Superior's Rock Bound Coast

THANK Goodness, better days were coming. The thermometer stood at twenty degrees above zero at New York City, but it was the shortest day of the calendar—December 20, 1921, the last day of the motor boatman's year. As the mariner always looks ahead, never astern, with prospects good for better boating weather, the old Hudson River, off the Columbia Yacht Club, at New York, didn't look half bad as Gar Jr. came speeding down with the tide and slowed up long enough to permit us to jump aboard.

Gar Jr. II was about to poke her nose into salt water again after her sojourn for the summer on the Great Lakes. It was at this same spot that the cruiser finished her memorable run up the coast last April when the running time of the train between Miami and New York was bettered by something like thirty minutes. But the trip south to Miami was not to be such a forced one, although the good



At the left is a view of the ice breaker after it had finished its work. The roughness is all due to the ice

Putting the blanks together to make the ice breaker

The ice breaker in place with lines leading to the deck

Sunset on the canal on the shortest day in year and the two last boats to pass through

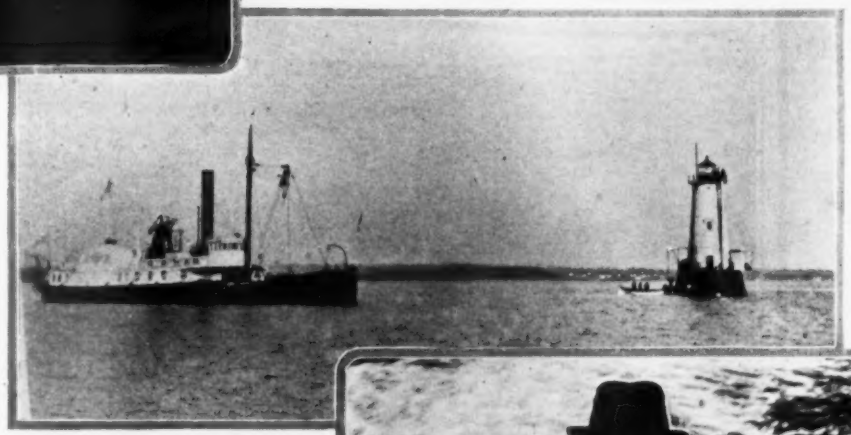
ship was in the same pink condition and was fit to give the train a return engagement, had the latter desired it.

Commodore Gar Wood, owner of Gar Jr. II, was not on board, but had given instructions to the crew to keep ahead of the ice line. There were two different routes available to the south out of New York, one an ocean run and the other via the inside route. The ocean run, of course, was preferable, but as the first real port is Norfolk, Va., which is 300 miles from New York, this meant more than a daylight run at this time of the year, even with Gar Jr.'s extraordinary speed. While the crew was game, yet the owner had given instructions to avoid night runs, so the alternate had to be chosen, namely, down New York Bay to the Raritan River, up this river to New Brunswick, N. J., thence via the Delaware and Raritan Canal to Bordentown, N. J., down the Delaware River to Chesapeake City which is on the Chesapeake and Delaware Canal, through this canal to Chesapeake Bay and finally down to Norfolk, Va.

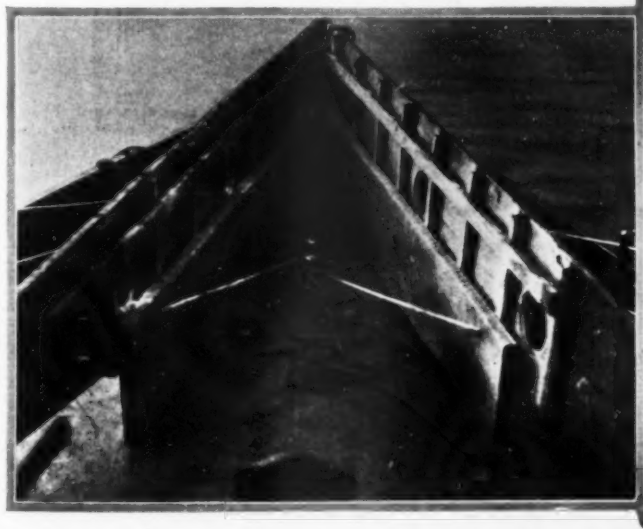
It was 10:30 A. M. when we boarded Gar. Jr. at the Columbia Yacht Club and as the Delaware and Raritan Canal was to close for the winter the next morning at 7 o'clock, it meant keep moving, so Joe Kinney, the efficient Captain-Engineer, stepped on her, and gave her all she'd take.

On a December day with the thermometer at 20°, one doesn't look with much favor upon any kind of a trip on a motor cruiser, even of the ordinary slow speed type. However, when you consider a 30-miler sailing into a wind of perhaps equal velocity, the picture becomes even less inviting, that is, as it used to be viewed. But on Gar Jr. everything was snug and warm, so that we might have been riding in a heated Pullman car as far as any discomforts were concerned. The bridge was entirely enclosed with curtains and an oil stove was kept burning on the bridge, so overcoats were

(*Continued on page 174*)

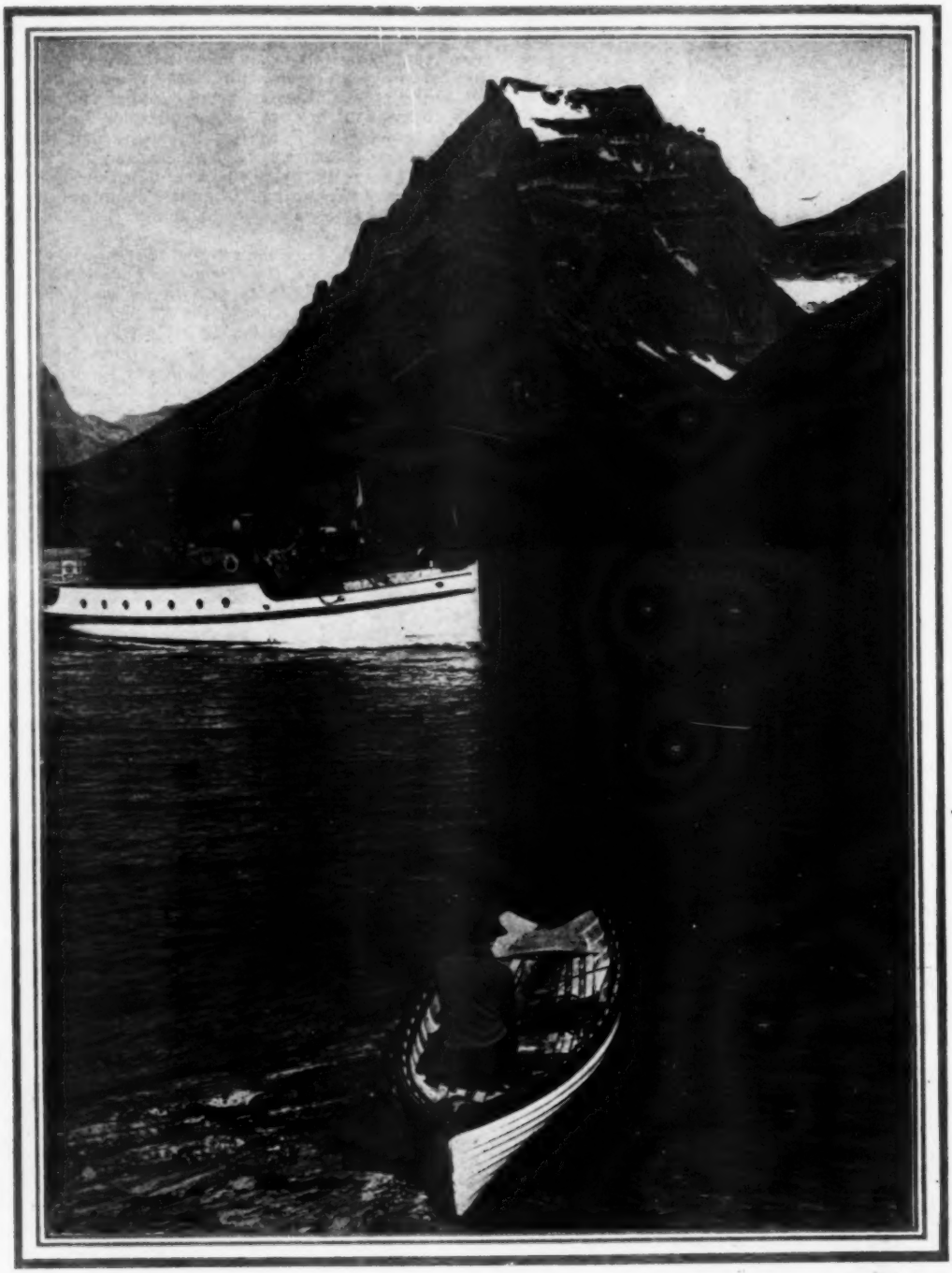


The buoy-setter was taking up the buoys for the winter



A view of the ice breaker on the forward deck of Gar Jr. II where it was carried when there was no ice

Little does it matter to Commodore Frank Littlejohn whether it be December 20th or the middle of June



Photograph by John Kabel

Happy Fishing Grounds

In St. Mary's Lake, Glacier National Park, Montana, time has wrought a transition from the rough canoes of the Indians to the power craft of the pale face. But Going-to-the-Sun Mountain towers immutable above the lake, mysterious and austere as when the redskin cast for lake trout at his base

Correspondence Course Comes to a Close

The Last of the Lessons on Small Boat Handling, Seamanship and Piloting—Enrollments of New Students and Work of Old Ones Not to Stop—Announcement of New Course in Dead Reckoning

THE last lesson in MoToR BoatinG's Correspondence Course in Piloting, Seamanship and Small Boat Handling is published in this issue. We regret as much as our readers that the course cannot continue indefinitely. It has been a source of great pleasure to prepare the various lessons and be of what little assistance we have been in teaching the motor boatmen more about those things which make life afloat really worth while. It has given us great pleasure and satisfaction also to view the enthusiasm with which our efforts were received by thousands and thousands of motor boatmen, not only from all parts of this country, but from all sections of the world.

We deeply appreciate the words of approval which have been sent to us in letters from our readers. Now that the course is finished we would like to have all those who have followed it, either as students enrolled or otherwise, write to us and tell us wherein the lessons have helped them, as well as to give us their suggestions for taking up work along somewhat similar lines in MoToR BoatinG in the future. We should be very glad to make an effort to explain points which may not have been made clear in any of the lessons, as well as to give the correct answer to any of the questions printed in connection with the Correspondence Course Lessons.

Even though this is the last lesson we do not intend that the ending will be an abrupt one for we have plans to announce to you of which we feel sure you will approve.

First of all we want those who have passed all the examinations to know that their certificates signed by the examiners and the Editor of MoToR BoatinG will be forwarded to them just as soon as the examiners report to us. The questions on Lesson No. 13 will be published in March MoToR BoatinG which will mean that the first batch of answers will be sent to the examiners on March 31. Therefore, early in April the reports of the examiners on the last lesson will begin to reach us. As soon as we get these we will prepare the certificates and forward them to those in whose names they are issued. So you will get your certificate by the time your boat is ready to go into commission in the spring. The names of the successful ones will be printed in our May issue.

In the April issue of MoToR BoatinG we will begin to review the Correspondence Course, Lesson by Lesson. That is, in the April number we will take up Lesson No. 1 which was on The Rules of the Road, Hints on Motor Boat Handling and Proper Whistle Signals to Blow. We will print the correct answers to the questions of Lesson No. 1 as well as discuss the various points which were most generally misunderstood as judged by the answers we received. In this way we hope to review the course in a way which will be of the greatest benefit to our readers.

That the course is completed does not mean that those who have not yet sent in their answers to the complete set of lessons will be barred from submitting further answers. Neither does it mean that those who have failed in one or more lessons may not try again. Even those who have not yet enrolled may still do so if they care to.

However, as we are to publish the correct answers beginning with our April number, naturally, we cannot accept answers received subsequent to their publication. Therefore, all answers to Lesson No. 1 must be in prior to April 1, 1922; those to Lesson No. 2 on or before May 1st; Lesson No. 3, June 1st, etc., etc.

We wish to publicly thank the examiners who have all worked so faithfully and have co-operated with us to make the course the success which it has been. Over three thousand papers and well over one hundred thousand answers have been examined by them. The names of the examiners follow: Messrs. A. B. Bennett, Washington, D. C.; H. A. Jackson, New York City; Sigmund Cohn, New York City; Milton N. Price, Baltimore, Md.; Theodore I. Coe, New

(*Continued on page 66*)

Questions For Lesson No. 12

Lesson published in January MoToR BoatinG

(*See page 66 for names of those passing in December*)

1. Describe the Yacht ensign.
2. Describe the American ensign.
3. What is the shape of the Club Burgee?
4. What is generally the shape of the owner's private signal?
5. What is the shape of a flag officer's flag?
6. Describe the owner's absent flag.
7. Describe the guest flag.
8. What time are colors hoisted?
9. What time are colors taken in?
10. From whom is the time to hoist or lower colors taken?
11. When is owner's absent flag flown?
12. When is the guest flag shown?
13. If one belongs to more than one Yacht Club should he display more than one Club Burgee at a time?
14. If one belongs to more than one Yacht Club which Club Burgee should be flown?
15. When is the United States Jack flown?
16. During what hours is a flag officer's flag flown?
17. Does a person who is a flag officer fly his officer's flag or his private signal or both?
18. If one who is a flag officer of a club is cruising with or at the anchorage of another club of which he is a member but not an officer, should he fly his private signal or his officer's flag?
19. Is it proper to ever fly two flags from the same hoist?
20. Is it ever permissible to fly a flag with a name spelled out thereon?
21. An open boat having only bow and stern staffs, flies what flags?
22. Where is a flag officer's flag displayed on an open boat?
23. A boat having bow and stern staffs and signal mast, displays what flags and from where?
24. Where is the owner's absent flag flown?
25. Where is the guest flag flown?
26. Where is the owner's meal flag flown?
27. Where is the crew's meal pennant flown?
28. Is it ever permissible to fly a flag before 8 A. M. or after sun-down with the exception of the flag officer's flag?
29. A boat with two masts flies what flags and where?
30. Should a U. S. Government Vessel or a commercial craft fly the Yacht ensign?
31. What flags are flown by a club tender?
32. What flag is flown by a boat in a race?
33. Where is the ensign flown on a sailing craft under way?
34. Where is the ensign flown on a sailing craft at anchor?
35. Where is the ensign flown on an auxiliary yawl?
36. What flag is half-masted to indicate the death of a citizen of national importance?
37. What flag is half-masted to indicate the death of a club member?
38. What is the proper procedure in destroying or disposing of a national ensign which has become worn out?
39. What is the proper method of exchanging salutes?
40. What is the procedure in half-masting flags or hauling down flags from a half-masted position?

Photograph by John Kabel

Miss Liberty at Sunset

The afternoon sun catches for an instant the peaceful bustle of the bay, and leaves in partial obscurity Miss Liberty of New York. She, thinking of the things she has seen—amateur boatmen cruising adventurously toward the open sea, awestruck immigrants at their journeys' end, American soldiers on their way to and from foreign wars—reflects that all human endeavor ends in repose, and that position in life counts for everything

Practical Hints on Small Boat Handling

Suggestions on Steering, Engine Room Signals, Action of Propeller, Winds and Currents, Indications of Shallow Water, Picking Up the Mooring, Anchoring and Docking, Some Additional Tidal Data, Hints on Fog Navigation, and the Use of the Lead Line, Etc.

MoToR BoatinG's Correspondence Course, Lesson No. 13

By A. O. Goold, E. A. McCann and G. Bradford

MANY of the old timers along shore will assure you that good boatmen are born and not made. You will also hear, and may properly believe, that the captain of an ocean liner will often cut a sorry figure at the helm of a small motor boat or sailing craft. Be that as it may, certain principles govern the handling of small boats and an understanding of them cannot but prove of assistance while the novice is accumulating his share of practical experience.

For, as in most accomplishments, doing the thing is the best training for its mastery, and to learn to handle small boats there is no course of instruction so efficient as to take the helm yourself and, in fair weather and foul, pick up your experience bit by bit.

There seems to be no real reason why any man with an inborn love of the sea, average strength and a desire to learn should not become expert in the art of handling small craft after an apprenticeship of not too great a duration.

I cannot well devote much space here to the elementary consideration of the boat and her parts. Most prospective boatmen will have informed themselves as to the classes of small craft, their names and their missions. They will know the bow from the stern, the rudder from the propeller, and the functions which the commoner units of equipment are designed to fulfil.

THIS is the last lesson in MoToR BoatinG's Correspondence Course. The questions on this Lesson will be published in our March Number. Enrollments in the course will still be open. See announcement on page 25.

Beginning in the next issue of MoToR BoatinG our new Correspondence Course on the subject of Dead Reckoning will begin. We promise that it is going to be the best and greatest thing of its kind ever attempted. We want everyone who has followed the present course to enroll in the new course on Dead Reckoning. Be sure to send us your name for enrollment. —Editor.

Become Familiar With Sailing Craft

While, doubtless, most of those who read these lines are devotees of the motor boat, it cannot be denied that a familiarity with sailing craft may be of considerable benefit to the motor boatman. Sail craft are always maneuvering when under way. There is constant action and they supply much and varied experience. Orders are given and executed with a snap which is seldom seen on the motor-driven craft. Sailing a boat, too, develops a man's resourcefulness. He learns to think promptly and to act on the instant.

Many of the terms in common use on the wind jammer should be a part of the motor boatman's vocabulary. This is particularly true as regards terms relating to the wind and its relation to the boat. It is true that the motor boat is to some extent independent of the wind, but under many conditions a knowledge of wind and weather lore is of vital importance. The sailboatman terms the side of his craft toward which the wind blows, the weather side. The other side is the lee or leeward side. Off the wind, indicates that the vessel is sailing with the wind abaft the beam. Down the wind, means sailing with the wind over the taffrail. Into the wind's eye, into the wind, or heading to windward, all indicate that the boat is heading in the direction from which the wind comes. Running before it, running free, or running down the wind, all indicate a course directly away from the point from which the wind comes. A beam wind, is one which blows directly at the boat's side or at right angles with her keel.

The strength of the wind likewise greatly interests the motor boatman, since this factor governs the size of the waves in which he must navigate and the pressure upon the boat's hull and top hamper which always affects her progress more or less.

Next to producing sustained motion in his craft the boatman is most interested in directing it to suit his purposes.

The Helm

The term helm bears a certain relation to the steering of the boat, to the rudder, and its operating mechanism, and every boat, except some of those propelled by oars or paddles, must have a rudder of some sort. In rowboats or canoes the function of the rudder is fulfilled by the oars or paddles. The rudder is usually a flat wooden plank or metal plate of considerable area hinged back of the vessel's deadwood and just beneath the stern and capable of being swung from side to side by means of a tiller and suitable tackles leading to a steering wheel which is placed in some elevated and sightly location. When this submerged area is swung into the comparatively undisturbed water to one side of the vessel's keel, the pressure upon it reacts and the stern is forced toward the opposite side from that toward which the rudder is inclined.

The meaning of the term helm should not be confused, as it sometimes is, as having the same meaning as the rudder or the steering wheel, for such is not the case. It is true that the helm bears a certain definite relation to steering and to the position of the rudder but, on the other hand, the relation of the helm and the steering wheel is not fixed or definite. The word helm probably has been handed down to us from the old sailing days when ships were steered by the tiller and before the introduction of the steering wheel as we know it today.

Steering wheels are rigged or connected to the rudder in two different ways. Some wheels are rigged so that when the wheel is swung to starboard, the boat's bow will also swing to starboard. On the other hand, some steering wheels are also rigged so that when the wheel is swung to starboard, the bow will swing to port and conversely when the wheel is swung to port, the bow will swing to starboard.

There seems to be no standard method of rigging steering wheels on small craft. This fact is also true in relation to larger vessels, especially steamboats plying on our harbors, inland waters and coast. For example, the tug boats of Boston Harbor have their steering wheels so arranged that the bow swings in the same direction as the wheel. New York tug boats have their wheels exactly the opposite, that is, the bow swings in the opposite direction from the steering wheel. Just as to the advantages and disadvantages of each method there is not much to be said in the favor of either method. A little practice will make one as adept by one method as by the other.

However, of the relation of the helm, the wheel and the boat's steering, this can be said, and be taken as universally true without exception. When an order is given to port the helm, the steering wheel must be operated in one way or the other, depending on how it is rigged, in such a manner that the boat's bow will be swung to starboard. When the helm is to put to starboard, the wheel is so turned that the boat's bow will swing to port.

Therefore, it will be seen that unless the meaning of the term helm is clearly understood that some little confusion, perhaps followed by disaster, is likely to result.

The impression that the vessel's head swings under the influence of the rudder is not literally true since the bow swings but little, the after part of the ship being directly under the influence of the helm. This point should be borne in mind when maneuvering in close quarters about docks or shipping, and a watchful eye over the shoulder may sometime save your craft a heavy bump, if nothing worse.

A rudder exerts greater turning power on slow boats if its area is not too deeply submerged. On the other hand, a shallow rudder is almost useless when running in a heavy sea, since it is constantly being thrown out of water and steering with accuracy is out of the question. As in most boating problems a compromise offers the best solution, and a fairly deep rudder of generous area will prove satisfactory in average cruising motor craft. Racing boats use rudders of very small area, and many of the speedy hydroplanes have theirs located forward of amidships.

Influence of Propeller on Steering

The propeller, when in action, is constantly forcing a column of water of its own diameter directly astern. This column of water reacts upon the rudder's surface when the latter is thrown into its path and will at times cause the boat's stern to begin swinging even before the hull gathers headway. The fact that the propeller revolves in water of uneven density (that at the bottom being denser than that near the surface) causes all motor boats to carry a slightly stronger helm on one side than on the other. This helm variation is allowed for by the steersman without difficulty, but if the wheel was placed exactly amidships, the craft would describe a large circle instead of a straight away course. A right-hand wheel causes a boat to have a tendency to head to port, since the stern, if we can picture it in this way, acts as if mounted on a wheel rolling to starboard on a hard surface, thus naturally forcing the bow to port. A left-hand wheel produces an opposite effect.

In backing, all steering rules are reversed, but the rudder usually acts in a more sluggish manner when backing, and care should be used not to reverse at any considerable speed and to use great caution in backing out through narrow dock entrances or between anchored vessels.

Engine Room Signals

The engine room telegraph is an accustomed bit of equipment on the bridges of sea-going craft, and its familiar dial markings,—Ahead—slow—half—full, and Astern—slow—half—full—are also to be read upon a duplicate dial before the engineer's operating platform. The movement of a handle turns an arrow-point to the position desired on the pilot's dial and instantly with a jangling of bells the engineer's arrow moves to the corresponding order on the indicator before him.

The steamboat code of gong and jingle bell is simple and is in everyday use upon thousands of coastwise craft. Bell pulls in the pilot house connect by means of wires with a gong and a jingle bell in the engine room and the code is as follows: With engines stopped, one bell indicates, slow ahead. Two bells indicate, slow astern. With engine running ahead one bell indicates, stop. Four bells with engines running ahead indicate, reverse the engines. The jingle bell indicates, full power in whatever direction the engines are moving when the signal is given.

I was interested to note during a visit aboard one of our newer battleships that in addition to the latest methods of signalling from the navigating bridge to the engineer's operating platform, this rather primitive method was installed as a relief in case the more elaborate systems should fail.

Making Landings

When maneuvering to make a landing at a dock or float with a motor boat having a reverse gear, this procedure will usually give good results. First look over the location where you desire to land carefully to discover obstacles or craft under way, which may move into your proposed field of operations. Satisfied that you have a clear approach, you allow room to swing round broadside to the landing place, preferably laying your port side against the float, since in reversing with a right-hand wheel the port side swings inward. On nearing the point where you will begin to swing, reduce your speed to a safe degree, bring the boat round in a smooth sweep until abreast your berth with way about gone and close in. Get fenders into position if necessary. Then reverse until all headway is checked and the boat touches the float. Get head and stern lines ashore and detail a man with a boathook to fend off and care for the boat while at the landing.

In case of landing with considerable wind and sea, judgment is necessary to decide the method to be used. Lying head to wind and sea is always the best practice if the situation makes this possible. Or if the float is to windward, little difficulty will be experienced. Otherwise, great care will be needed to prevent chafing or injury to the hull. Of course the boat should not be permitted to lie at an exposed float any longer than absolutely necessary. Several fenders should be used at the points of contact and two men may be needed to hold her clear of the landing.

The man at the wheel has the most responsible position on the ship. He chooses for his charge the safest and most direct courses, avoids collision with neighboring craft, gives whistle signals for passing, and in fog, rain or snow. He plots courses on the chart and, by the aid of his compass, he guides the little ship along the paths he has selected. In bad weather much of the comfort of the ship's company depends upon the helmsman. He can ease her through seas which seek to overwhelm her, and can so maneuver her that danger and discomfort are minimized.

Steering Hints

Boats do not all steer alike. Some respond readily to the helm, its action being prompt and decided. Others are sluggish or uneven in their response to its guidance. The helmsman must learn the peculiarities of his own craft and he will find it a fascinating study under the varying conditions of wind and sea. He should learn to steer a straight course with no wavering of the wake or needless detours. He will pick out a land mark, a lighthouse, perhaps, far off on the horizon's edge and will head for that point, running off mile after mile with the least possible divergence.

He will often steer by compass in broad daylight just for practice and to check up errors which might prove serious at night or in an enshrouding fog. He will note the amount that a wind of certain force and direction will set him off a course. He will note the seaward sweep of the outflowing tide as he crosses the entrance to a noble sound. A sound broadly opening out of the bay between large islands. He tries to locate the baffling currents as he crosses a river mouth with its torrent of fresh water rushing out against the tide which forever combats it.

He learns the pale blue color which marks a shallow area over white sand. He learns the dark blue streaks which locate mud flats, and the dull brown tint over a kelp growth with its barnacle covered ledges just visible through the broad ruffled strips of floating, writhing vegetation. He can detect the smooth, oily patches where eel grass lies on the surface, threatening a tie-up in the engine room should those strong enveloping strands wind up around the revolving wheel until the motor slows down, down and stops. Nothing but a strong arm and a sharp knife can clear away the great ball of fibrous grass which fills the space from stern post to rudder when the unwary navigator runs into eel grass with motor at full throttle.

When the young helmsman has learned to sail his craft on summer seas, he welcomes a chance to see what she will do, in a hard chance, as the fishermen say. Perhaps he is out on a day's outing. He has been sixteen miles down the bay and in place of returning as usual through the maze of protecting islands he heads boldly out through a narrow passage into the open Atlantic. No sooner has he fixed his course for the Cape Lights far ahead than he notices that a haze has dimmed the brightness of the sky toward the southwest. The breeze, which heretofore has been cheerfully brisk, rippling the blue water until it

Fig. 269: Diagram on which to plot Reductions to Soundings.

Draw two vertical lines to the left so that each dotted line represents one foot. With O as a center describe a series of semi-circles, one to each foot, perhaps making every fifth heavy. To the right of these, draw lines parallel to those on the left, outside the radius of the arcs, to represent the total depth of water.

Draw three or more arcs of any radius for the tidal intervals, that is the time between high and low water. As most tides are between 5½ and 6½ hours make one for each period and divide it into half hours (11 when 5½ hours, 12 when for 6 hours and 13 for 6½ hours interval). Draw a heavy line to represent mean tide level (M. T. L.) and work up and down from this. The diagram shown will give you a range of 28 ft.

To use the diagram.

Suppose on March 10th, 1922, we are off Eastport, Maine, and took a cast of the lead at 10:30 a. m. and require the reduction to soundings. Turn to the tide tables:

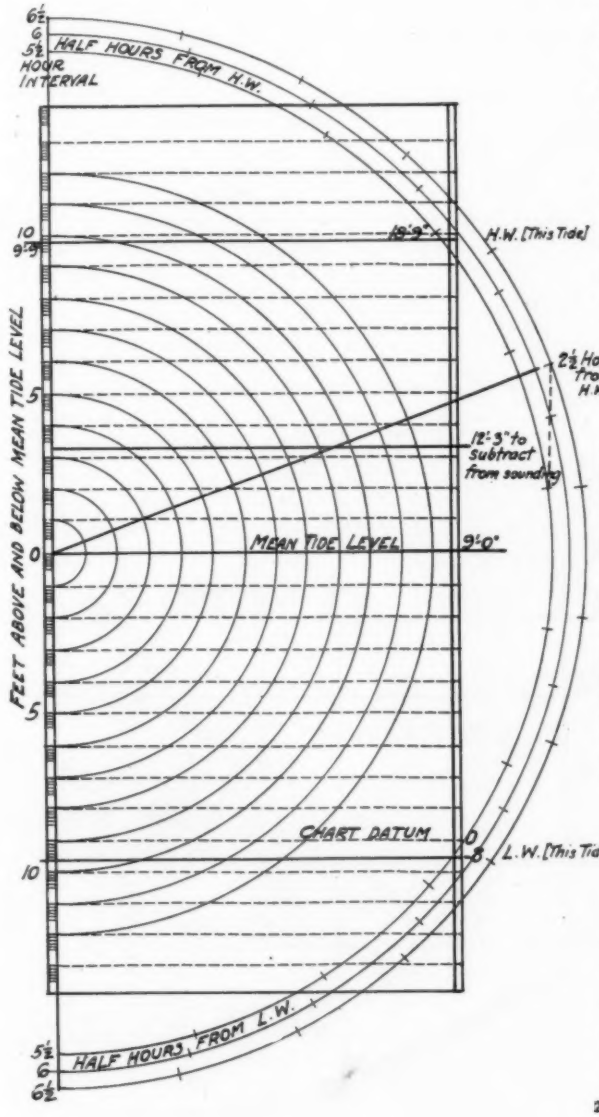
EASTPORT (Pearce's Wharf), MAINE, 1922.

MARCH

Day	High Water		Low Water	
	Time	Ht.	Time	Ht.
	h. m.	ft.	h. m.	ft.
1	0 11	18.1	6 31	0.2
W	**12 29**	**18.2**	**6 50**	**0.3**
* *	* *	* *	* *	* *
9	6 42	18.0	0 40	1.4
Th	**7 18**	**17.5**	**1 15**	**0.2**
10	7 43	18.9	1 41	0.4
F	**8 17**	**18.6**	**2 14**	**—0.8**
11	8 43	19.9	2 38	—0.7
Sa	**9 13**	**19.8**	**3 09**	**—1.9**

Take from it:		Height of H. W.	18 ft. 9 in.
Time of H. W. 7h. 43m. a. m.		Height of L. W.	0 ft. 8 in.
Time of L. W. 2h. 14m. p. m.		Range of Tide	2 18 ft. 1 in.
Time occupied in falling	6h. 31m.	Mean Tide level	9 ft. 0 in.
Time of H. W.	7.43 a. m.	Height of H. W.	18 ft. 9 in.
Time of Cast	10.13 a. m.	Height above M. T. L. or Half Range	9 ft. 9 in.
Time from H. W.	2.30		

This gives us the duration of the tide as 6½ hours, and the cast as 2½ hours from H. W. so we mark off 2½ hours on our 6½ hour arc. Draw a line from this to the center. Where the 9 ft. 9 in. arc cuts this line draw a horizontal line. Where this last cuts on the left will be the amount to add to M. T. L. to get the amount to subtract from the lead line. To make it simpler extend the line to the right and count up in feet from the datum (which is where your 9 ft. 9 in. arc cuts the vertical line at the bottom). This at once gives the necessary correction. Work in pencil so that when finished with it may be rubbed out and your diagram ready for the next sounding.



sparkled in the sun, now increases and the sea begins to make. The boat takes on a new motion, rising and falling more vigorously than is quite agreeable. The weather grows duller but the sun is not entirely obscured. The wind now pipes up more vigorously and spray occasionally begins to pelt in over the port bow. In an incredibly short space of time a sizeable sea is making the little craft plunge and wallow in a manner quite thrilling to the skipper and his crew.

Spray now comes cascading over the raised deck, and oil clothes are hurriedly pulled out and donned by the little party. The skipper heads his craft off shore farther and farther in the effort to meet the oncoming seas nearly head on, and after running several miles he finds himself two miles off shore and with a broad sound opening nearly under his lea. He has favored the boat all he could, heading up to the large seas, making what headway he could through those not so large and, although feeling that this was quite an experience, he has been enjoying the battle with the elements. Things are now decidedly wet and uncomfortable in the cockpit and with all the skill he can muster he cannot avoid taking a full sized bucketful of spray into the cockpit every two or three seas. So after a word with his mates he watches for a smooth place in which to turn as he plans to run back into the sound for shelter before the wind and sea. When a good sized sea passes, a fairly smooth spot appears ahead. He figures that turning to starboard is safest, so he puts the wheel over rapidly, although with some misgivings as to the result. The next sea rises under the quarter, giving the little ship a strong heave, but when the skipper sees that the entrance to the sound lies ahead, he rights his helm and the boat shoots down the slope of the sea.

He is somewhat alarmed at the greatly increased speed of his motor which up to now has been running with fair regularity. Rightly figuring, however, that the wheel is being relieved of its load as she toboggans down into the trough, he slows down the motor a trifle to save wear and tear. On this course no more spray comes aboard and the motion, while vigorous in the extreme, is less violent and, on the whole, rather exhilarating. The young skipper steers a straight course for the entrance, paying strictest attention to the work in hand. He knows that if the stern is allowed to swing that fatal inch too far to

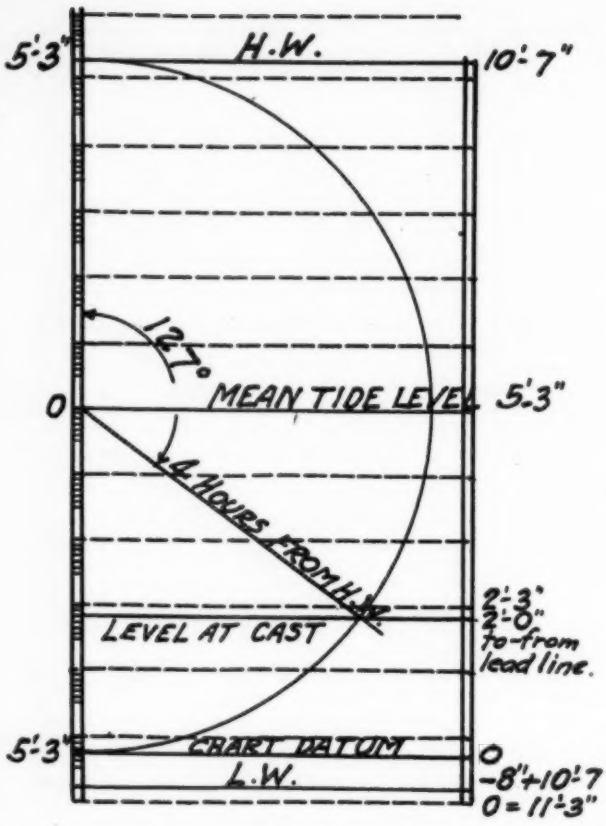


Fig. 270, at the left: Instead of making a stock diagram, we may work each example out as it comes on a sheet of ruled paper.

Suppose we are off Wellfleet, Cape Cod, on the same date and wish to correct a sounding taken at 4:39 a. m. This time we have to go to the second half of the tables where we find:

TABLE 2.—UNITED STATES, East Coast

New Hampshire to Massachusetts	Latitude	Longitude	Tidal difference: Time of tide	Tidal difference: Height of H.W.	Ratio of ranges	High-water interval	Mean range of tide	Spring range of tide
	° ′ North	° ′ West	h. m. Stand	feet ard po	rt, Bos	h. m. ton, p	feet age 29	feet
Sandy Neck Light.....	41 43	70 17	0 00	−0.2	1.0	11 27	9.4	10.8
Wellfleet, Cape Cod.....	41 56	70 02	−0 10	+1.1	1.1	11 20	10.7	12.2
Provincetown, Cape Cod..	42 03	70 11	−0 10	−0.4	1.0	11 22	9.9	10.5

This gives us H. W. Interval	2/11h. 20m.
Time of tide rising	5h. 40m.
Range	2/ 10 ft. 7 in.
½ Range	5 ft. 3 in.

Now turn back to Boston where we find for March 10th:

H. W. Boston	8h. 49m. a. m.	Height Boston	10 ft. 1 in.
Difference	−0h. 10m.	Difference	+ 1 ft. 1 in.
(p. 338)		Height Wellfleet	11 ft. 2 in.
H. W. Wellfleet	8h. 39m. a. m.		
Time of Cast	4h. 39m. a. m.		
Time from H. W.	4 hours.		

For the angle of swing: As 5h. 40m. is to 4 hours so is 180° to the required angle.

5h. 40m. : 4h. :: 180° : required angle

60 : 60

20/340 240

17 : 12h. :: 180° : required angle

180

17/2160

127 the required angle.

On your ruled paper describe an arc with 5¼ spaces radius for the half range. From the centre draw an arc of 127° where this cuts your 5 ft. 3 in., arc draw a horizontal line, which will give the same result as in Fig. 270 in this case showing 2 ft., to be deducted from the lead line.

When the angle of swing is less than 90° you need only draw the upper half of this and when more than 90° the lower half.

starboard or port that a heavy sea taking her at a disadvantage would roll the little ship over and over. As the boat nears her goal and passes between the headlands marking the entrance to the sound, the sea becomes much less boisterous, and when at last she rounds the buoy and heads up the Roads, it is hard to realize that on the other side of the island a smoky sou-wester is piling up the breakers in drifts of white. The skipper has a new-found respect for his boat. She is no longer merely a plaything. He has found what she would be like in a hard chance and he no longer dreads meeting one.

Picking Up a Mooring

In picking up a mooring, a motor boat may follow the procedure of the sail boat, although in good weather no maneuvering will be required. In bad weather it is generally advisable to approach the buoy head to wind and sea. A man forward with a boat hook stands in readiness to fish up the buoy with its pennant attached, generally over the starboard bow. Speed is reduced as the buoy is approached and the problem is to lose all headway with the buoy within easy reach of the boat hook. When the buoy is hooked, the helmsman generally runs forward to lend a hand with the mooring line which must be hauled up into the bow and, stiff and unyielding with salt water, placed securely over the mooring bitts. He has left his motor in neutral and now goes aft to shut down his power plant, leaving the other member of the crew to make fast and clear up on deck.

Anchoring

In anchoring in unfamiliar waters, it is usual to select a favorable spot on the chart. A mud, clay or sandy bottom will be a good holding ground, but a bottom of rocks or ledge covered with kelp should be avoided if possible. Room to swing should be available with sufficient water at low tide for safety, but very deep water is not to be desired. When entering port, intending to anchor, find the spot you have marked on the chart and make sure that no other boats lie moored too close for

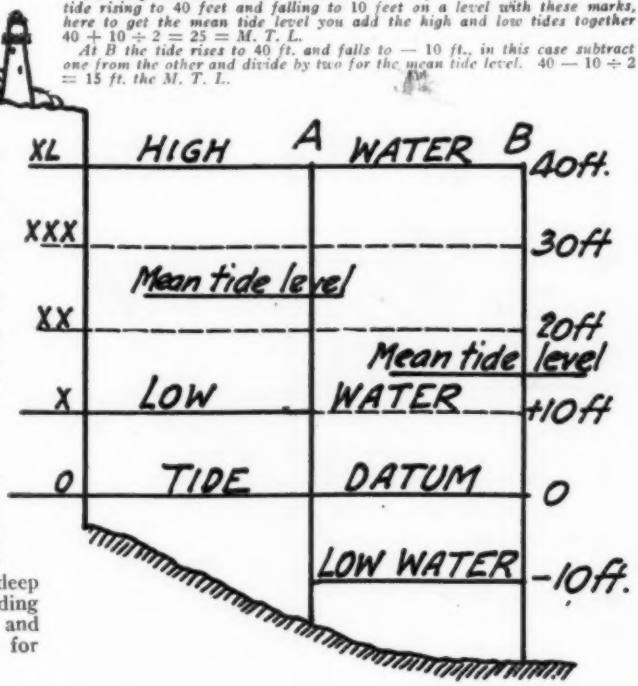
(*Continued on page 172*)

Fig. 271, below: In both the examples here given there is a minus (—) sign before the low water height, that means that the low tide on that day is below the Chart Datum or horizontal line to which the tides for that chart are calculated.

Tides are usually calculated from some point on or near the shore, perhaps a sea wall, which is marked in feet, long enough to extend above and below the spring tides, but at another point nearby the tide may sink below this mark, hence the minus sign.

Our diagram shows such a sea wall with the feet marked, on line A is a tide rising to 40 feet and falling to 10 feet on a level with these marks, here to get the mean tide level you add the high and low tides together 40 + 10 ÷ 2 = 25 = M. T. L.

At B the tide rises to 40 ft. and falls to — 10 ft., in this case subtract one from the other and divide by two for the mean tide level. 40 — 10 ÷ 2 = 15 ft. the M. T. L.



The Bowline

The Most Universal and Best Method of Making an Eye in the End of a Rope Where the Permanency of an Eye-Splice is Not Desired

Fig. 272—*Take the standing part between the finger and thumb of the left hand, palm up. Take the end in the right hand in the same way, but palm down. Lay the end over the standing part.*

Fig. 273—*Catch hold of both parts where they cross with the right hand as shown. Advance the left hand over the right, catching the standing part above the end to form a small loop. With the right finger thrust the end up through the loop.*

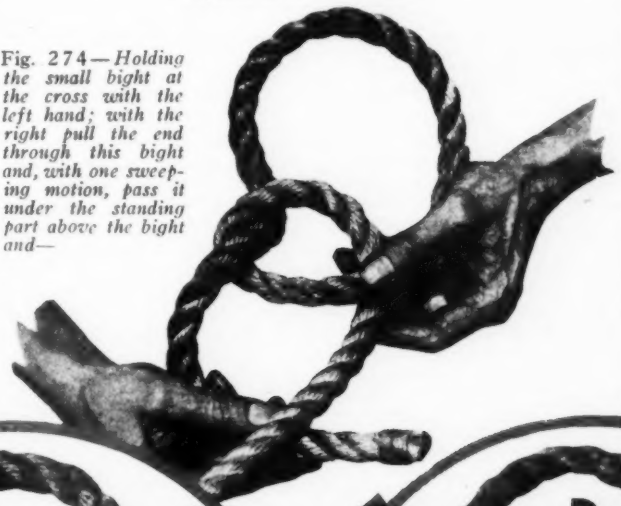


Fig. 274—*Holding the small bight at the cross with the left hand; with the right pull the end through this bight and, with one sweeping motion, pass it under the standing part above the bight and—*

Fig. 275—*Down through the bight again. Pull it down.*

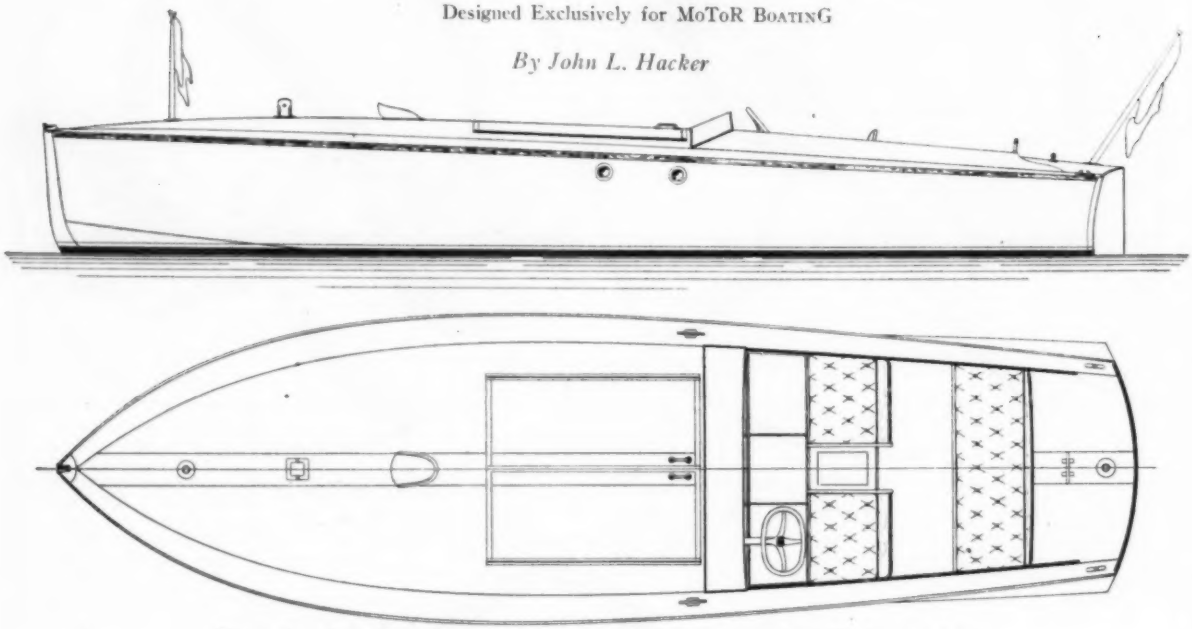
Fig. 276—*Haul all tight. Now do it again.*

Gladys, a Snappy 20-Foot Hacker Runabout

Complete Sets of Plans and Full Building Instructions and Specifications For Building a Wonderful Little Boat

Designed Exclusively for MoToR BoatinG

By John L. Hacker



The outboard profile and arrangement plan for Gladys, the 20-foot Hacker runabout

AN improvement on the little 14-footer which was published last month is presented in the plans herewith for this attractive 20-foot runabout. The little boat Marybelle was not designed to be exceedingly fast. In fact the small motor with which it is supplied is not powerful enough to drive the boat at more than 8 or 9 miles. It was intended primarily to be a handy little runabout able to go to and fro without fuss or disturbance. For those who want more speed we can promise that Gladys, the 20-foot runabout, when equipped with the specified Kermath motor will prove entirely satisfactory and deliver all the speed possible from this power plant. Later designs in this same series will be of larger and faster boats and the desires of the high speed enthusiast will be well taken care of.

The principal dimensions of this boat will be: Length over all 20 feet and beam of 5 feet 9 inches. In order to proceed with the building it is absolutely necessary to first lay it out correctly in full size. This is done by laying a board floor of sufficient size, or securing a large piece of fairly heavy detail paper at least 4 feet in width on a smooth floor. Place a straight edge on the bottom margin of the paper, aligned with a chalk line so that it is perfectly straight. Draw in the water lines and the station lines. When this is finished, begin laying out lines. Put in first the stem thickness lines both pointed and full. The straight edge will act as the base line, for both the height and half breadth plan. Lay out the keel line and determine the shape of the stem. Next locate the sheer line and then the chine line, followed by the buttock lines. Sight along these lines and see that they are perfectly fair. It may be necessary to give and take 1/16 inch or even ⅛ inch, but the lines must be fair. Use a one-piece batten for this work about ½ inch or ⅝ inch square. When these lines are in you can begin on the half breadths. When the chine line is put in on the height plan, put in the half breadth chine also, as it will be necessary to have this in order to carry down the starting point of the buttocks. Next put in the sheer lines and then the water lines. All of these must meet the pointed stem which should be carried down from the profile plan in the points where the stem intersects the water lines. When this is done, carry up the points where the water lines intersect the stem thickness lines. These intersections will form the rabbet line. Now take a piece of stock, the thickness of the planking, hold this on line with the water line, mark the inside which will form the bearding line, or depth of rabbet. When this is done, lay out another piece of paper on a board, inserting the water lines, center, and the buttock lines. Then transfer the off-sets, or rather lines, as they are, to this, and draw in the body plan. When you have finished this, take and draw in the side of keel on each station and get the proper bevels for rabbeting the keel. Next take off the thickness of the planking and proceed with the making up of the frames. The transom is to be of the curved type. Draw in the radius line, placing a thin batten on this line and mark where the water lines come, then by straightening out this batten and marking this length on the water lines it will give the extended transom plan.

In order to set up the work, the first operation will be the laying out of a straight line on which are located the various station points. Then set up a 2 by 2-inch post about 3 inches aft of each frame so that fastenings can be made later. These posts should be high enough to allow building. If the bottom of keel is kept about 1 inch or more above the floor it will be about right. When these posts are in place, raise the straight line, align the posts, and stay with stays both fore and aft and one thwartships. When these are all aligned, strike a line which will represent the base line. Take the proper measurements from the base line up to the keel and mark. When all of these points are marked, fasten a batten to see that everything is fair, and when fair, cut off the posts. Screw a small cleat on one side all the way through to extend high enough to fasten to rabbet. Next set up the keel and fasten to these cleats. Plumb the stem and stern and stay both securely in place. Next, proceed with the frames, the chines, the clamps, and then the stringers. Trim all neatly and apply the side planking. Put in fore and aft engine stringers and bolt firmly into place. Turn the boat over, put in the stringers fair up and proceed with the bottom planking. When this is completed, dress and sand the whole boat, and apply a coat of hot oil to the bottom below the

water line. First caulk the seams with spun cotton which is just rolled in and not driven. When completed, turn over and apply the inside coat and proceed with the finish.

Arrangements have been made whereby those desiring blue-prints to a scale of 1-inch to 1-foot, for this boat can secure them at nominal cost by addressing F. W. Horenburger, 63 West 184th Street, New York, N. Y.

This is the second design of MoToR BoatinG's latest series of popular small boat designs prepared particularly for easy construction by John L. Hacker, the famous designer of fast runabouts and cruisers. One complete design in this series will be published in each issue throughout the coming year. Favorable comments are being received from all sides on this new series, and it is predicted that numerous boats will be built from these plans.

Gladys, the little 20-footer whose design is published this month, is an exceptionally able little boat, outclassed by none. The design for the next issue will be for a still larger and faster boat.—Editor.

Specifications

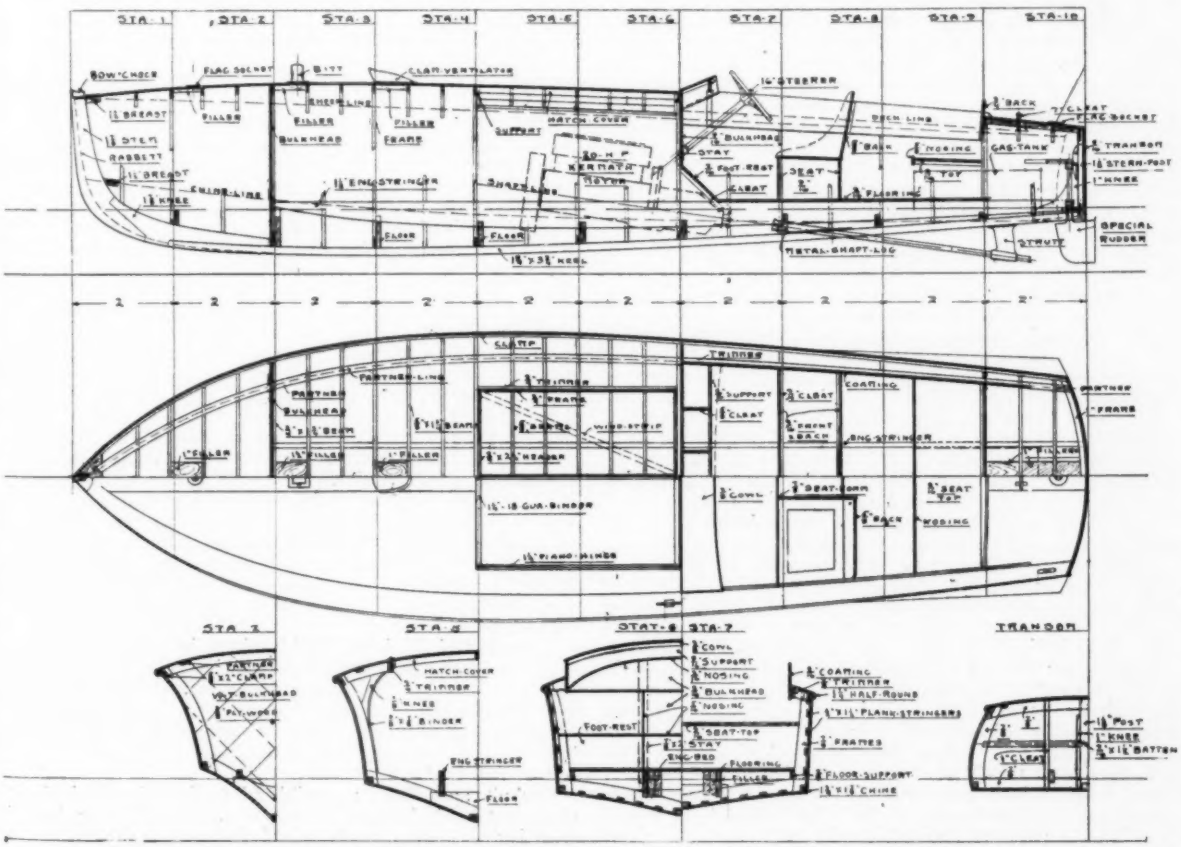
It is understood that all materials that are to enter into the construction of this boat shall be of the best grades for the various purposes intended. All workmanship shall be of the highest class. This boat shall be laid out in full size from lines as furnished, and no deviation whatever made, without full consent of Architect or Owner in writing.

Keel: To be of 1¾ by 3¾-inch white oak or yellow pine. To be in a single length, and properly beveled, and rabbeted to suit planking. Bore hole through for shaft, allowing ¼ inch larger than shaft to be used, and aligned to suit motor to be installed.

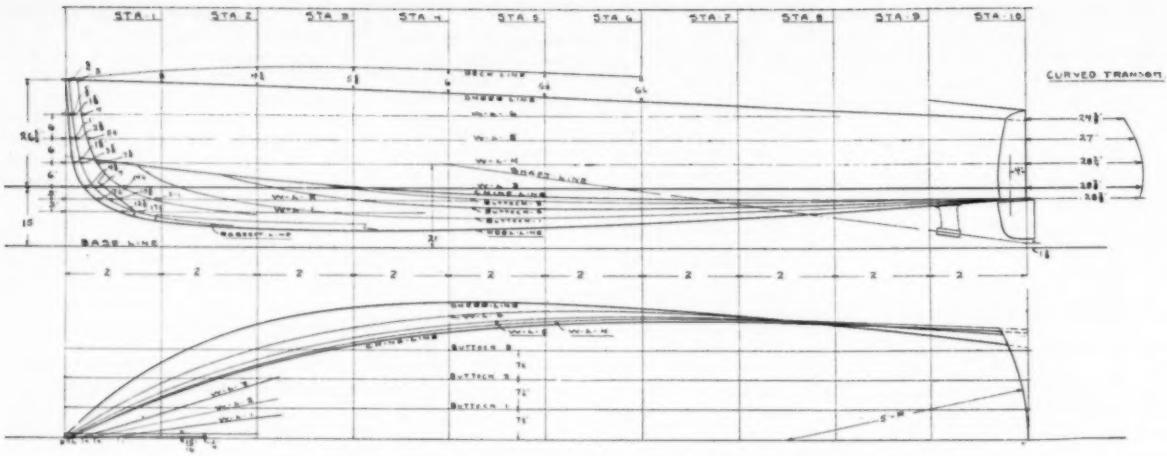
Stem and Knee: Stem to be preferably a natural grown hackmatack knee. To be 1⅞-inch sided, and shaped as per plan. Otherwise, to be of white oak of same thickness and joined to a knee with three 5/16-inch fastenings. To be properly beveled and rabbeted and to be bolted in a like manner to keel and finish the rabbeting. To have four fastenings to keel.

Transom and Frame: For straight transom, to have ¾-inch mahogany in a single width. To have cleat at bottom and top, also on sides of ⅞-inch oak, and stern post of 1¼ by 3¾-inch oak, to be screw fastened to cleats, etc., and holes wood plugged. Support on keel with a 1-inch hackmatack knee on each side, to be screw fastened into post and keel. For curved transome saw upper and lower member to proper radius, halve the side members into these. Also halve into stern post. Fasten to keel in a similar manner as straight transom. Bevel properly and cover with 9/16-inch mahogany. To be screw fastened and holes wood plugged. To have cleat in alignment with stringers, to reenforce transom.

Frames: To have a sawed frame on each station of ⅞-inch. To be preferably from a hackmatack knee. Otherwise, to have side and bottom member which are to be halved into each other at the chine. These to be from white ash or oak, and to be approximately 2¾-inch depth on bottom and 2¾-inch tapering to 2-inches at top on side members. Fasten with No. 8 copper rivets, having four on each side, allowing center space clear to fasten chine. Or these may be fastened together without halving with 3/16-inch galvanized bolts. To be joined with an oak floor tie of 1⅛-inch, using 1⅜-inch on stations 4, 5, and 6. To be either rivet or bolt fastened with at least four fastenings on each side, and then through bolted to keel with ⅜-inch bolts up to station 4. From these aft with two 5/16-inch fastenings through to rabbet. Bottom member of frame can be one continuous piece from chine to chine, beginning at station No. 7 and aft, in which case 1-inch stock is to be used. After planking is finished, have a ⅝ by 1¼-inch steam bent frame in between each sawed frame, this to extend from keel to clamp, and to fill in between the planking stringers and to have a filler with proper radius to chine.



Detailed construction drawings containing all information necessary for building Gladys, the 20-foot Hacker runabout



Complete set of lines for Glady's, the 20-foot Hacker runabout

Provide ties across keel same stock, or an oak floor, allowing an ample limber for drain.

Chines: To be shaped from 1¾ by 1⅞-inch white oak or yellow pine. To be in a single length and properly beveled and rabbeted to suit planking. To be reenforced to stem with a breast hook and to stern with a knee on each side. To be fastened to frames with ¼-inch copper rod, riveted over a burr. To be slightly tapered toward stem.

Engine Stringers and Bed: Stringers to be shaped from 1⅛-inch Aero Spruce. To be in a single length, checked in over the frames, and through bolted with 5/16-inch bolts. To be spaced to suit motor to be installed. (Spaced on plan for Kermath motor.) Engine bed to be of white ash and to have filler as indicated on plan, to be of 1¾-inch stock and through bolted to stringers every 9 inches and drift bolted into floor with 5/16-inch bolts and rod.

Clamp and Planking Stringers: Sheer clamp to be of ⅝ by 2-inch yellow pine. To be let into frames and securely screw fastened. To have breast hook at stem and a knee on each side at stern. Stringers to be ½ by 1½-inch yellow pine on sides and ⅝ by 1½-inch on bottom. To be spaced approximately as per plan, let into frames and screw fastened. To be in a single length.

Deck Beams and Framing: All beams on stations to be of ¾ by 1¾-inch. Except on stations 4 and 6, which shall be ¾ by 2¼ inches. Beams in between to be of ⅝ by 1¼-inch. To be of white wood or elm. To be sawn to proper radius and securely screw fastened to frames and clamp. Hatch trimmer to be of ¾ by 2¼-inch. Trimmer in cockpit to be ⅞ by 2½-inch and screw fastened. Partner to be 7/16 by 1⅜-inch to be let into beams and screw fastened. Center to form line for covering board. To have supporting knees on station frames which shall be bound with a ⅜ by ⅞-inch oak bent frame and screw fastened, except on bulkhead.

Frame in General: Entire frame to be neatly faired and trimmed. All joints to be well painted with lead paint before making fastenings. All fastenings in frame to be bronze, copper, and galvanized iron. When galvanized, to be well dipped into red lead paint before applying. All outboard galvanized fastenings to be counterbored and wood plugged, painting heads heavily with red lead.

Planking: Planking to be of white cedar, white pine, or cypress, for painted hull mahogany if natural. To be in as long lengths as practical, and of selected stock. To be spiled so that seams will meet on center of the stringers with ¾-inch No. 8 on sides and ⅞-inch No. 8 on bottom. To be copper riveted through bent frames and fillers with 2-inch copper wire nails, and such length as necessary through radius at chine. All joints to be made on butt blocks of quartered oak, and to have at least six fastenings on each side. To be screw fastened into keel, chines, stem, and stern, with 1-inch No. 8 screws. All holes to be counterbored with ⅜-inch Fostner plug bitt, and wood plugged, using plug from mahogany if the softer wood is used and boat is to be painted. Seams on sides to be made flush and blind caulked by making a groove in the center of each plank and inserting a strand of soft seine twine in between. Chine seam on side, and all bottom seams to be lightly caulked with spun cotton, rolled in, not pounded. Allow seams about 3/32-inch. To be thoroughly dressed and sanded, and apply coat of hot oil throughout. Half boiled linseed oil and half turpentine, apply boiling hot. Then fill seams with composition made from dry lead and spar varnish mixed to consistency of a thick paste. Sand before perfectly hard, after oil has dried out for 48 hours. Then apply coat of pure lead paint inside and outside.

Bulkhead: To have a water-tight bulkhead on station 2. To be of ⅜-inch Haskalite, or of two thicknesses of ¼-inch white pine, laid diagonally in opposite directions. To have light canvas drill in between, laid on marine glue and to be close riveted or copper tacked every 3 inches. To have cotton flannelette on frames laid on marine glue before applying. Also cotton on frame before planking. Cut an opening of approximately 16 by 20 inches, to be backed with ¾ by 2-inch cleats and make door so that it will screw fasten into place with a rubber gasket to make tight, for access only.

Decking: Covering boards and center plank to be of ⅜-inch mahogany and to be screw fastened to clamp, partner, and beams. Balance of decking to be of ⅜ by 2½-inch mahogany strips. These to be screw fastened to partner and galvanized nail fastened to beams, having two fastenings on each strip into beams. Strips to have uniform seams of about 3/32 inches. All holes to be counterbored and wood plugged. To be thoroughly dressed and sanded and to be caulked lightly with cotton or butchers' twine. If canvas, insert only one beam in between stations of ¾-inch. Then let in fore and aft battens of ½ by 1⅜-inch spacing 6 inches centers. Apply covering board temporarily, then plank with ⅜-inch cedar or pine, fastening with 1½-inch galvanized nails and screws into battens. Dress thoroughly, then remove covering boards and lay lightweight canvas duck in one piece in marine glue or heavy paint. If paint, treat the whole surface first, then when dry, lay canvas on heavy paint. Stretch well and when completed apply another coat of paint. When dry, fasten covering boards permanently, clean up well and apply filler and coat of Valspar. After second coat of varnish, smooth canvas surface thoroughly, then either apply two coats of deck enamel or three coats of japan color, and varnish together with wood work. Center plank should be of oak or mahogany.

Cockpit and Finish: Bulkhead to be of 9/16-inch in of ⅜ by 1½-inches. Fasten a wind strip of 5/16 by 1⅜-inch which is let into beams, then cover same as decking. If canvased, this may be of mahogany veneer, and flush brass screw fastened. Allow ⅛-inch all around to make free. Screw fasten a ½ by ½-inch oak hatch rest on each end to support hatch cover.

Cockpit and Finish: Bulkhead to be of 9/16-inch in alignment with bottom of coaming. Coaming to be of 9/16 inches. Back to be of ¾ inches. Bulkhead to be made up with 9/16-inch to foot rest in three panels to be

divided with a 5/16-inch nosing to form panels. To be backed with a ¾ by 2-inch stay to extend to stringer. To have a 9/16-inch cowl support with a 3/16-inch nosing. To have cleats to support and a ⅜-inch cowl, screw fastened to same. Flooring to be of white pine. To have foot rest in three sections. Sides to be screw fastened and center to be made to suit housing over motor. Flooring to be solid under seats and a removable section in between seats also, removable sections ahead of seat. Forward seat to have 9/16-inch front and back, backed with ¾-inch cleats and also cleats on top for division. Tops to be of 9/16-inch and to allow opening for access to locker under. To have two seat form seats, or preferably two Wicker Craft type Bucket seats (Hacker Pattern). Aft seat to be of open removable type and to set on a riser. To have a panel immediately aft of this, to be either screw fastened or buttoned into place for quick access under stern. All finish to be of mahogany except the flooring which shall be of white pine, also seat tops if desired. Sides of cockpit may be lined with ⅜ by 3-inch strips latticed and fastened to framing with brass escutchions.

Painting and Finish: All work to be thoroughly sanded and cleaned. Hull already specified to prime coat. To have three coats of Valspar bronze bottom paint, on bottom. And three coats of best grade of yacht paint, or enamel on sides. To have one heavy coat of lead paint throughout in interior, and three coats of desired color in motor room. All decking and natural finish in cockpit to be thoroughly dressed, sanded, and cleaned, and to be filled with best paste filler. Then to have three coats of Valspar. All coats to be well sanded and prepared before applying the second coat, etc. Flooring, seat tops, etc., to have two coats of lead paint. Seams, if natural, to be filled with Kuhl's white seam composition after the second coat of varnish. Depress seams slightly, using a 20-d wire nail with point rounded off. If Valspar bronze is decided on, paint bottom up to water line with red lead paint, and sides with coat of light lead color primer.

Fastenings: All fastenings, where exposed, to be of bronze or copper if for salt water. For fresh water, galvanized and treated as already specified. Use brass screws below water line and galvanized above. Otherwise already specified. All screws to be at least three times the length of thickness of material to be fastened.

Fender Guard: To be of 1½-inch half round which shall be screw fastened every 6 inches with hole wood plugged. Or of the V-shaped type, having a ⅝-inch face. To be fastened in a like manner and to have a protecting brass strip of ⅝-inch half oval, and screw fastened with oval-headed screws. To have a guard of shaped type from ⅞ by 1⅛-inch to extend from stern to a point where the top fender intersects. To be screw fastened and protected with ½-inch half oval brass, fastened in a like manner.

Hardware and Fittings

Steerer: To be of W. S. Hall & Co. type, with a cored drum. To have 16-inch wheel to be mounted on port side of boat and to have ¼-inch bronze cable leading to tiller, leading through 3-inch shieves and necessary fair leads to insure good wear.

Rudder: To be of Hacker type. Made suitable to this job. Consisting of bronze rudder, special stuffing box, special hanger bracket, and sliding type tiller.

Strut: To be of Manganese bronze of special Hacker type, suited for this design. To be securely bolted through keel with six ⅜-inch bronze bolts.

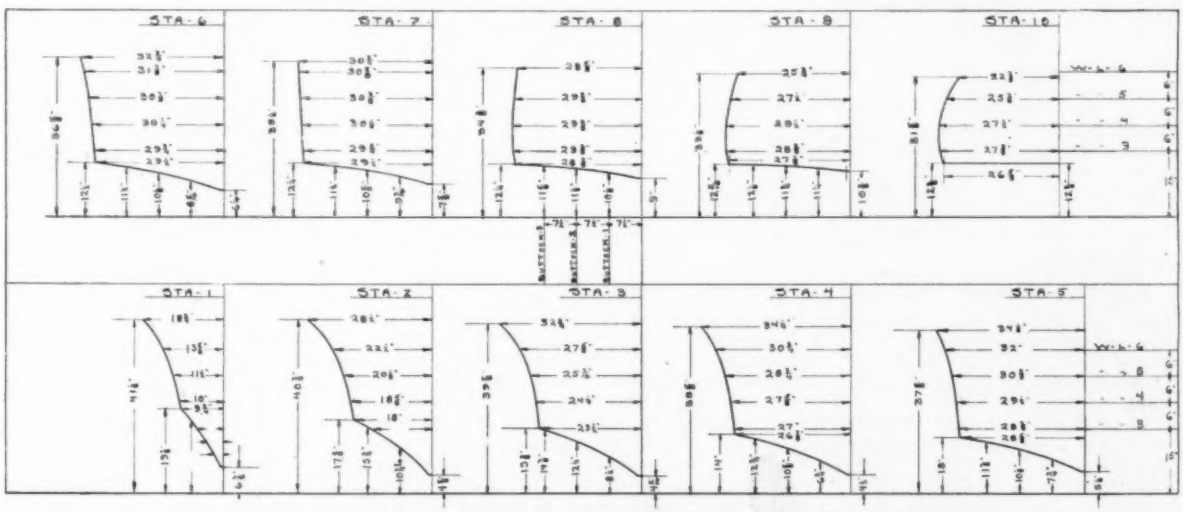
Shaft Log: To be of either Hacker type or Mechanical Devices Co. type. Either self aligning. To be securely screw fastened to keel with 1½-inch No. 16 brass screws.

Gas Tank: To be made from 18-gauge galvanized steel. To be of 9 by 15-inches and 30-inches in length. To have two splash partitions. To be riveted every 1½ inch and well soldered. To have a 1¼-inch filler plate on top and a ¼-inch opening at bottom. To be located in between stringers, extending to front of seat, which shall have a mahogany board or box to make tank invisible from cockpit. To be securely cleated into place. Gas to motor to be had through use of a vacuum feed. To have shut-off valve at tank. To be filled through deck and connected with 1¼-inch pipe to a screw type deck fitting for filling.

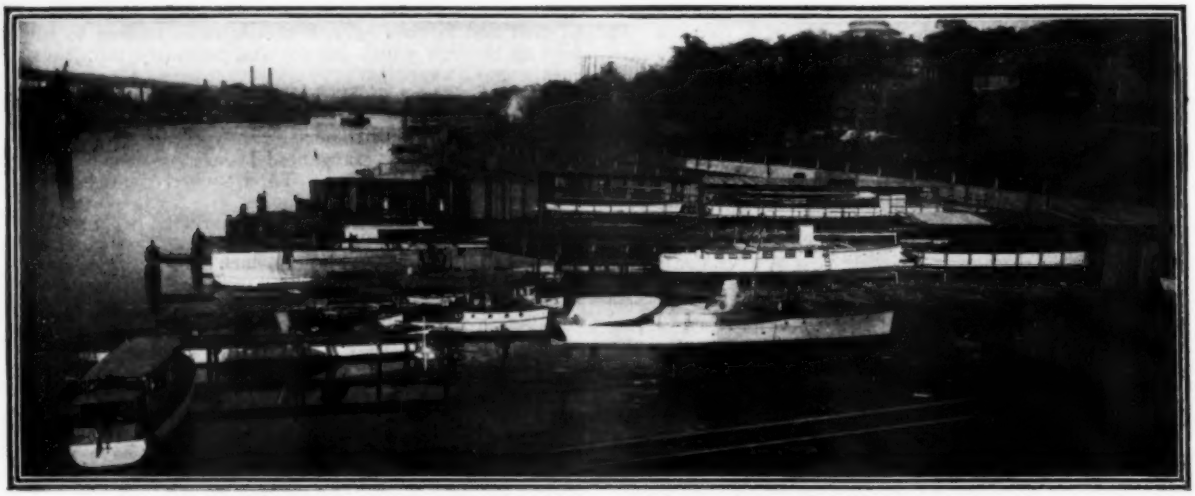
Deck Fittings: To have ½-inch half round brass to protect stem. A special bow chock. Bitt 2½ by 2½-inch regulation type. Hacker type clam ventilator. One 6-inch cleat on each side. One 7-inch cleat on stern deck. One 4½-inch chock on each side aft flag socket forward and aft of regulation type. Hatches to be mounted with 1¼-inch piano hinges and to be bound with 1¼-inch 18-gauge brass. To be screw fastened every 2½ inches with No. 7 oval-head brass screws. Hatches to have brass lifting handles and suitable hatch quadrants.

Motor Installation: Motor to be a 20-h.p. Kermath with 4 by 4-inch bore and stroke. To be properly aligned and fitted with 1⅛-inch shaft and bolted to foundation. Exhaust to be either of galvanized pipe, or copper tubing. All bends to be made preferably of a 45 degree angle. A portion of overflow water to enter into exhaust pipe to keep cool. All water piping to be of brass or galvanized and to have regulating intake fitted with a globe valve and hose connection to motor. Overflow to have special overflow fitting and elbow inside with nipple, then a hose joint to motor. All gasoline piping to be of annealed copper tubing, having a 5/16-inch tube to vacuum tank, same size tubing from tank to carbureter with valve next to carbureter. Fittings to be of S. A. E. type. All tubing to be properly cleated to insure safety. All wiring to be properly made according to directions and instructions sent out with motor. To be well cleated, accessible and invisible as possible. Controls to be carried to steering wheel. Starter switch to be mounted immediately above foot rest so as to operate with foot. Fit out with 15 by 20-inch three-bladed propeller. All work on installation to be executed in a first-class manner

(*Continued on page 170*)



Drawings which contain the information necessary to prepare the molds at each station



Consolidated built boats in winter storage at the company docks, Morris Heights, N. Y.

When My Ship Comes In

A Trip Through the Consolidated Shipbuilding Plant at Morris Heights, New York City —How Modern Industry Has Contributed to the Ancient Art and Science of Shipbuilding—Suggested Methods to Increase the Popularity of Motor Boating and Cruising

By Horace Holley

THE fates that preside over human destiny see to it that at least one man in ten is born with a hunger for the sea.

It doesn't matter where this "one man in ten" first opens his eyes, or where he spends his youth. He may live in the great woods, on the prairies, or in the tenement district of an inland city—sooner or later, like a tireless Sherlock Holmes on his trail, the sea-longing tracks him down, and he knows that his hour has come.

Thereafter, his friends and relatives know that he is a changed man. The sting of the salt wind is in his nostrils, the pulse of the wave is in his blood, and like a prisoner trying to escape from confining walls, he tries to get back to the sea.

* * *

Perhaps he has the fever in a mild form, and contents himself with reading books of travel and sailors' yarns. Perhaps he only cuts a picture of a steamer or full-rigged ship out of some Sunday newspaper and frames it for the wall of his den, scarcely knowing why he does so. Perhaps he sends for catalogues of yachts, cruisers or motor boats—all depends on the grip of the passion that has marked him for its own.

Anyhow, the heart of one man in ten points seaward, faithful as a compass to the north, and it was thinking of how powerful this ancient sea hunger is, and how closely it knits together all manner of folk in one common bond, that I seized upon the opportunity of going through the Consolidated Shipbuilding Plant at Morris Heights, New York,—a landlubber by necessity, but a sea lover by divine right!

* * *

Like all sensible men, the ownership of a fully equipped yacht or cruiser seems to me to represent the fulfilment of human ambition and achievement, and it was to understand just how this bright dream is actually realized in a workaday world that I planned my steps through the Consolidated Plant.

First of all, of course, the born sailor (whether rich or poor) has a pretty clear idea of what kind of a craft it is that drops anchor "when my ship comes in." How is a man "fitted" to a yacht?

Well, it seems that you go into conference with an extraordinary person who has "fitted" many hundreds of sailors before you, and consequently like an experienced architect, knows how to sketch your own particular castle in Spain.

* * *

You just light your pipe and describe to this man what a wonderful ship *you* have in mind. A few strokes of the pencil—and there, for the first time, you see the form and outline of your thought.

But this, of course, is only "a painted ship upon a painted ocean." The next step, after you have approved the rough sketch, is to pass it into the drafting room, where a department of trained people project this rough sketch into its architectural details. In the case of Consolidated, the drafting room has two parts—one of ship design—the other of engine design, the well known Speedway marine engine being produced at this plant.

The result of this cooperation between ship and engine designers is to "synchronize" or balance the various essential factors, weight, power, proportion, speed, etc.

* * *

When the working drawings are complete, your yacht or other craft, like a butterfly emerges from its paper or chrysalis stage. The third step is to the Mould Loft—a kind of glorified bowling alley or dance hall where the design is laid out to full size, with pins, on a carefully smoothed floor. When the pins are in place, a batten is laid down, its curve determined by the pins, and examined to see if its lines are perfectly fair.

Next, (their measurement determined by the batten), templets of steel or wood are made, and from these templets the ship of your dream takes shape.

* * *

Thus the ship itself comes into gradual being, a unique and custom made affair, for in this Mould Loft the templets are constructed with respect to the particular design under consideration. When the templets are in place, the lines of the hull are thereby determined.

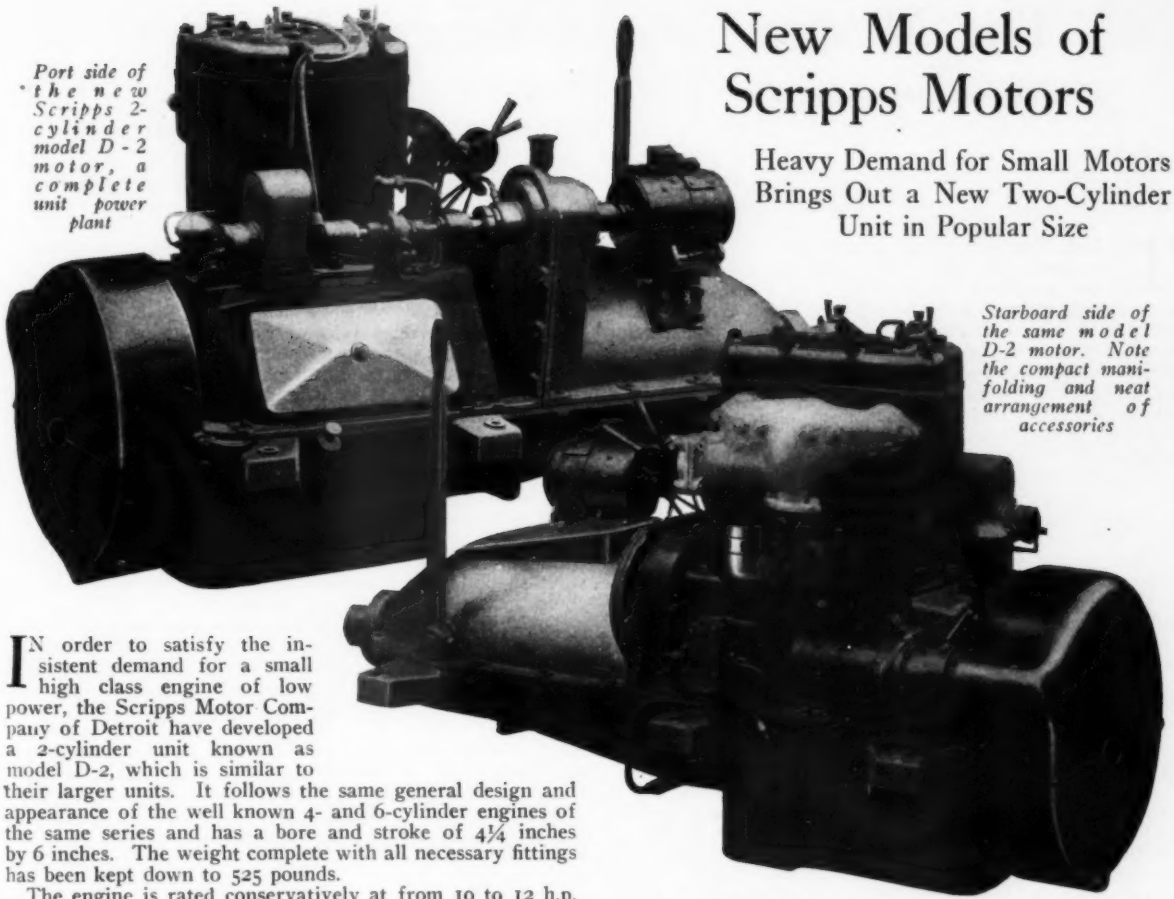
Meanwhile, other parts of the craft are under construction in various departments. The engine, for instance, is being assembled in the machine shop, and the ship's fittings, such as furniture, cabinet-work and upholstery, are produced by experts in their corresponding departments.

To pass from one to the other of these departments is to see many of the most contrasting activities of modern

(*Continued on page* 68)

New Models of Scripps Motors

Heavy Demand for Small Motors Brings Out a New Two-Cylinder Unit in Popular Size

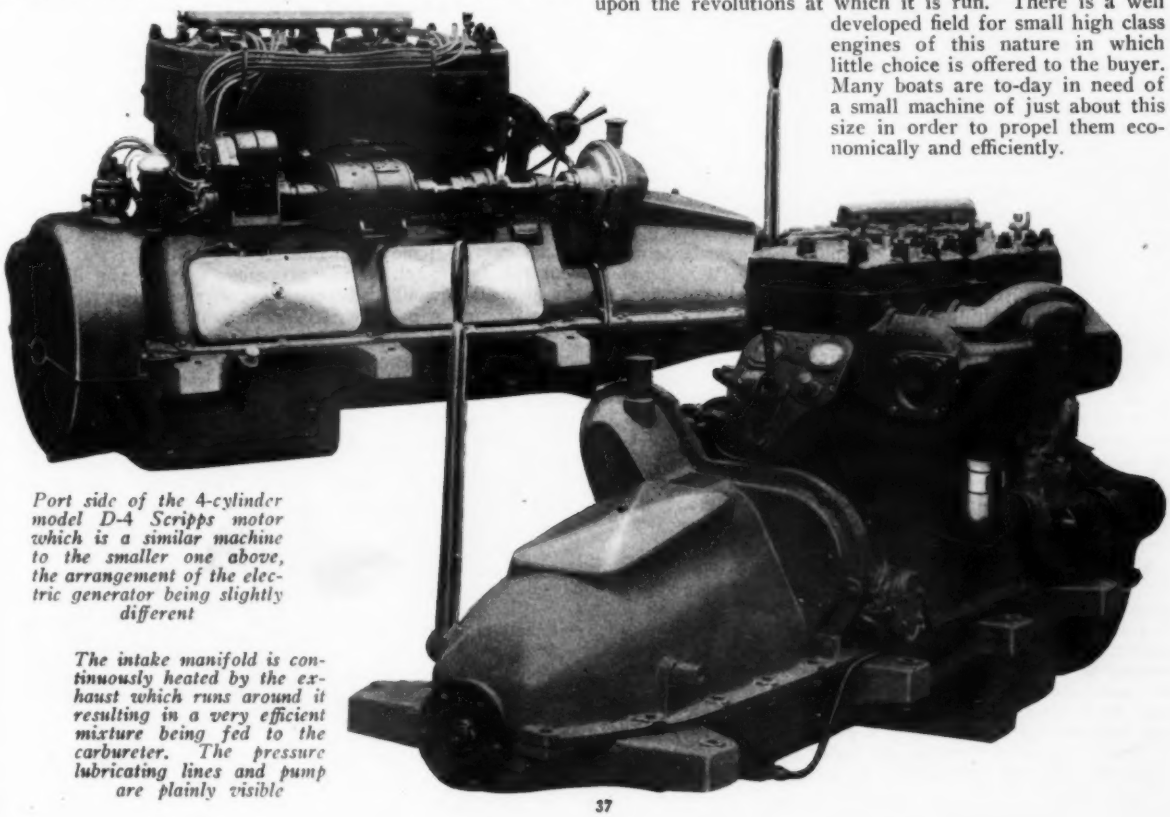


Port side of the new Scripps 2-cylinder model D-2 motor, a complete unit power plant

Starboard side of the same model D-2 motor. Note the compact manifolding and neat arrangement of accessories

IN order to satisfy the insistent demand for a small high class engine of low power, the Scripps Motor Company of Detroit have developed a 2-cylinder unit known as model D-2, which is similar to their larger units. It follows the same general design and appearance of the well known 4- and 6-cylinder engines of the same series and has a bore and stroke of 4¼ inches by 6 inches. The weight complete with all necessary fittings has been kept down to 525 pounds.

The engine is rated conservatively at from 10 to 12 h.p. in medium duty work, and when used for semi-speed purposes it will develop from 15 to 18 h.p., depending naturally upon the revolutions at which it is run. There is a well developed field for small high class engines of this nature in which little choice is offered to the buyer. Many boats are to-day in need of a small machine of just about this size in order to propel them economically and efficiently.



Port side of the 4-cylinder model D-4 Scripps motor which is a similar machine to the smaller one above, the arrangement of the electric generator being slightly different

The intake manifold is continuously heated by the exhaust which runs around it resulting in a very efficient mixture being fed to the carbureter. The pressure lubricating lines and pump are plainly visible

The Mystery of the Screw Propeller

An Interesting and Practical Explanation of the Scientific Problems Governing the Action of the Screw Propeller and the Propulsion of Vessels

By S. E. Slocum, Ph.D.

Consulting Engineer, General Machinery Foundations Co., Philadelphia.

THE sport of motor boating is founded on two modern inventions: the internal combustion engine and the screw propeller. Every motor boat fan of course takes special pains to keep fully posted on all the latest developments in hull and engine design, but for some reason is satisfied to accept a stock propeller, selected without any special care, and forget about it. This lack of interest in the propeller is no reflection on motor boatmen, as most marine engineers and naval architects also seem to think that their work ends at the outboard bearing of the propeller shaft.

Probably the screw propeller is usually thought of as a modified form of paddle wheel, and that just as the action of a pair of side paddle wheels resembles that of a pair of oars, so the action of a screw propeller resembles that of sculling with a single oar over the stern. Nothing, however, could be farther from the truth, and it will add greatly to the fascination of motor boating when it becomes generally recognized that the action of a screw propeller is a scientific problem of the deepest interest and most practical importance.

It is of course impossible to discuss the scientific aspect of propeller action in a popular article of this nature, but it is quite possible to lay a foundation for an intelligent understanding of how a propeller works, which will open up a new line of interest in motor boating.

The screw propeller, as its name indicates, is built like a screw with part of the thread cut away so as to leave several projecting blades, the standard number of blades in Naval practice being three. The front of the blade is called the pressure face and is generally made flat, as there seems to be no reason for making it of any other form, and a flat surface is more easily constructed than any other. The back of the blade is called the suction surface and is usually an arc of a circle, so that a cross section through the blade has the form of a segment of a circle. The outline or profile of the blade is usually chosen arbitrarily as an ellipse, so that a full-fledged standard marine propeller looks very much like the leaf of a shamrock or a three-leaved clover, one side of the leaves being flat and the other side rounded. The shape adopted for screw propellers and the method of determining their dimensions to fit any particular vessel and engine have been arrived at almost entirely by experiment, thousands of experiments on screw propellers having been made in this country and in England during the last half century. The names most conspicuously associated with this work are W. Froude, R. E. Froude and S. W. Barnaby in England, and Admiral D. W. Taylor and Admiral C. W. Dyson, in the United States. These men and their associates deserve great credit for having obtained such a high efficiency of screw propulsion by purely empirical methods.

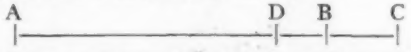
The pitch of a screw propeller has the same meaning as for an ordinary screw, namely, by pitch is meant the distance the screw would advance in a solid nut if it was given one complete turn. This definition is all right if the leading face of the blades is flat and formed to a true screw surface, but in this case the pitch of this surface should be called the face pitch or geometrical pitch, as there are other terms, such as true pitch and experimental mean pitch, which have a different significance.

Although a propeller is constructed with a helical surface like a screw thread, it is misleading to think of its action as resembling that of a screw. An ordinary screw working in a solid nut advances a distance during each revolution equal to its pitch, or the distance between successive threads, whereas a screw propeller working in a yielding substance like water does not advance through the water a distance equal to its face pitch, but a shorter distance. The difference between the face pitch of a propeller and the distance it actually advances through the water in one revolution is called the slip. At first sight it is perhaps natural to think that a propeller would work most efficiently if it had no slip, but such is not the case, for if it worked without slip it would exert no thrust at all. Anyone can convince himself of this fact by watching a propeller work. It will be observed that there is a jet of water behind the propeller, the so-called race or slip stream, which moves faster than the surrounding water. In fact, the thrust exerted by a propeller is due to the momentum it imparts to the column of water directly behind it. This is not the exact scientific explanation of propeller thrust, but it is as near as we can come to it without going too much into detail. Therefore if the water which leaves the propeller moves faster than the water which enters it, it is apparent that there must be slip of the propeller with respect to the water. Looked at from another point of view, if a propeller screwed its way through the water without slip, the pressure on opposite sides of the blades would always be equal and the propeller could not possibly exert any thrust.

There are several peculiarities with regard to propeller slip. First of all, there is always a certain definite value of the slip ratio at which the propulsive efficiency is greatest, and in designing a propeller to fit boat and engine it is always desirable to come as near as possible to this particular slip. Moreover, there is one particular speed of revolution at which the propeller will exert no thrust, and the distance the propeller moves forward in each revolution when this condition holds is called in England the experimental mean pitch. It can also be proved that there is a higher speed of revolution at which the torque on the propeller shaft will be zero, but the propeller will exert a negative thrust, that is, it will act like a drag, or as though it was reversed.

Of course, it is apparent that a propeller should be so designed as to be adapted to the engine which turns it as well as to the form of hull which it drives. A little consideration will show why each combination of motor and hull must be accompanied by the choice of a particular propeller in order to obtain a satisfactory overall efficiency.

To explain the effect of the hull on propulsion we will make use of the accompanying diagram.



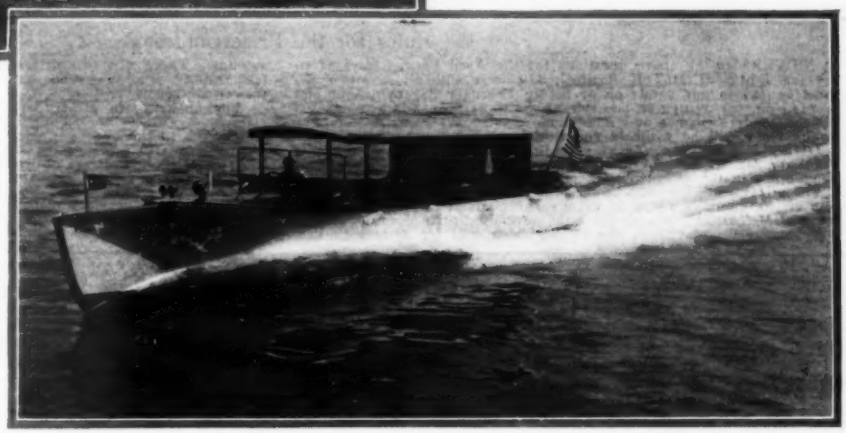
In this figure, suppose that the line AB represents the speed of the vessel; that is to say, AB represents the distance the vessel moves in one second. Also let AC represent the face pitch of the propeller, that is, the distance the propeller would advance in one revolution, provided there was no slip. Then BC represents the apparent slip of the propeller. Instead of representing this slip by the line BC, it is customary to use the ratio $\frac{BC}{AC}$, which is called the apparent slip ratio.

Now the water directly behind a vessel has a different velocity with respect to the vessel from the water at the bow. In other words, the water from either side of the vessel flows in at the stern and produces a following wake. A vessel being towed by another has a wake just as well as one being propelled by its own power. In the diagram let BD represent this wake velocity. The propeller now acts like a propeller advancing in open water with a speed AD and slip DC. This new slip ratio $\frac{DC}{AC}$ is called the real slip ratio, while the ratio $\frac{DB}{AD}$ is called the wake fraction, and will be denoted by w.

If, then, we let V denote the speed AB of the vessel,

(*Continued on page 178*)

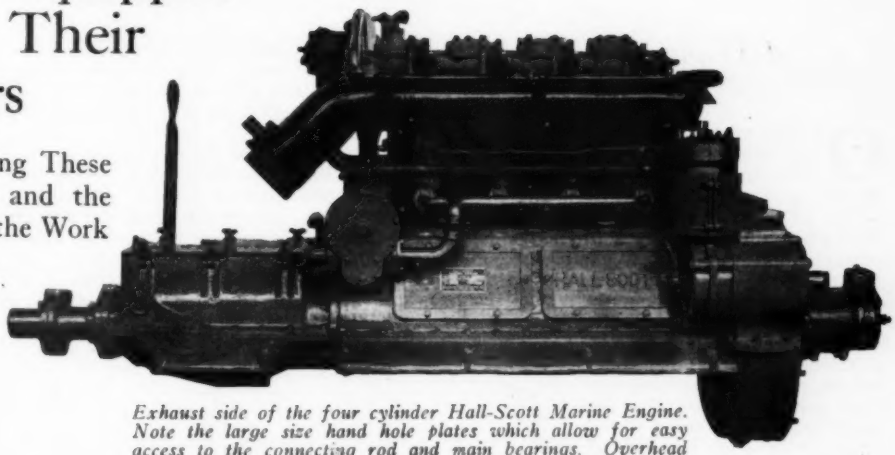
Ricochet, a runabout designed by Fred. D. Lawley and built by Geo. Lawley & Son Corp. for Horatio N. Slater of Port Washington and New York for Ocean and Long Island Sound waters. Length 30 feet 4 inches, Beam 7 feet 1 inch. Power 200 h.p. Hall-Scott Marine Six. Speed better than 36 m.p.h.



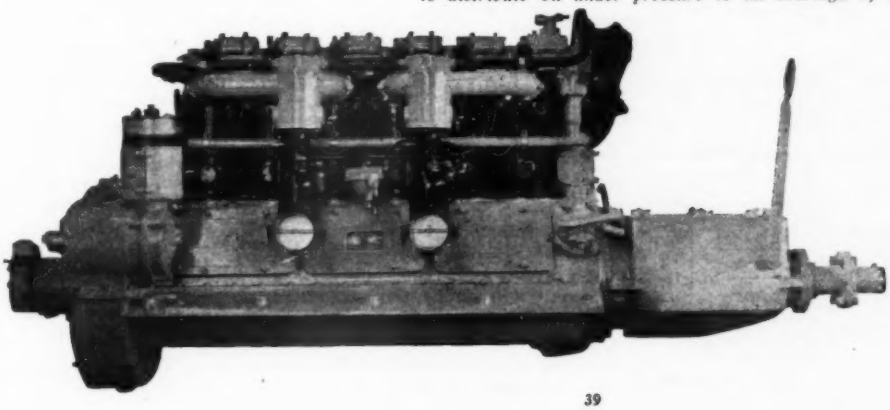
Jean, a 45-foot typical Thousand Island day cruiser, owned by Commodore Jas. H. Hammond of Pittsburgh and Alexandria Bay. Beam 8 feet 6 inches. Designed and built by Hutchinson Bros. Power 6-cylinder, 200 h.p. Hall-Scott Marine engine which drives this craft 3 to 27 m.p.h. as desired

Hall-Scott Equipped Boats and Their Motors

Typical Boats Using These Modern Machines and the Motors Which Do the Work



Exhaust side of the four cylinder Hall-Scott Marine Engine. Note the large size hand hole plates which allow for easy access to the connecting rod and main bearings. Overhead valves are actuated by rocker levers with their bearings in the camshaft housing. A large capacity pressure oil pump is used to distribute oil under pressure to all bearings of the motor



Intake side of the six cylinder Hall-Scott Marine Engine, showing the twin carbureters and the water-jacket intake manifold. Motors are equipped with cast iron cylinders and manifolds designed for salt water service. Unusual care is taken in casting and finishing these cylinders to insure uniform thickness throughout

SMALL MOTOR BOATS

Their Care, Construction, and Equipment

A Monthly Prize Contest Conducted by Motor Boatmen

Questions Submitted for the April Prize Contest

1. Describe a device for diminishing the supply of cooling water through the cylinder jacket, without putting any additional strain upon the pump, for the purpose of increasing the engine efficiency.

2. Is it possible to use a gasoline-kerosene mixture as fuel in an ordinary gasoline motor, and if so, what proportion of each fuel and what special precautions in running are necessary?

(Suggested by H. H. P., Oakland, Cal.)

Rules for the Prize Contest

ANSWERS to the above questions for the April issue, addressed to the Editor of MoToR BoatinG, 119 west 40th St., New York, must be (a) in our hands on or before February 25, (b) about 500 words long, (c) written on one side of the paper only, (d) accompanied by the senders' names and addresses.

The name will be withheld and initials used.

QUESTIONS for the next contest must reach us on or before February 25. The Editor reserves the right to make such changes and suggestions in the accepted answers as he may deem necessary.

The prizes are: For each of the best answers to the questions below, any article or articles sold by an advertiser advertising in the current issue of MoToR BoatinG of which the advertised price does not exceed $25, or a credit of $25 on any article which sells for more than that amount. There are two prizes—one for each question—but a contestant need send in an answer to only one if he does not care to answer all.

For answers we print that do not win a prize we pay space rates.

For each of the questions selected for use in the following month's contest, any article or articles sold by an advertiser advertising in this issue of MoToR BoatinG of which the advertised price does not exceed $5, or a credit of $5 on any article which sells for more than that amount.

All details connected with the ordering of the prizes selected by the winners must be handled by us. The winners should be particular to specify from which advertisers they desire to have their prizes ordered.

Removable Glass Wind and Spray Shield

Details of Construction For This Practical Addition to Cruising Comfort on the Cruiser

Answer to the Following Question Published in the December Issue

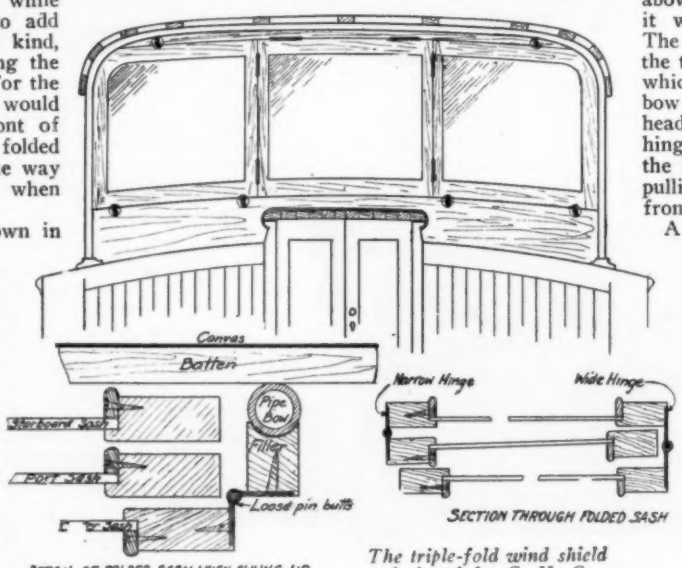
"Describe the construction of a folding or removable glass wind and spray shield for a small cabin cruiser"

A Triple Fold Wind Shield

(The Prize-Winning Answer)

OFTEN when the small cruiser is driving into a head sea, with the cold wind blowing the rain or spray aboard, some sort of a glass windshield would be very desirable and add greatly to the comfort of those on board. There are also a good many other warm summer days when any arrangement of this kind is entirely unnecessary and also undesirable as an obstruction to the breeze and more or less in the way. This is probably why some have built glass fronts on their small cruisers and often wished they were off, while others have hesitated to add anything more of this kind, although greatly realizing the need at certain times. For the small boats the solution would seem to be a glass front of neat design that can be folded and swung up out of the way or removed entirely when desired.

The arrangement shown in the sketch was planned for a small raised deck cruiser having a khaki top supported on pipe bows as shown. There are so many different deck arrangements and styles of canopy or awnings that some slight changes will be necessary when used on a different type of boat. The front was divided into three sections as this arrangement made the sash of a size easily handled or stowed. The two side sash were hinged to the center sash and arranged to fold back on this sash. Then as the center sash is hinged at the top, it can be swung up with the two side sash above it and secured to the battens above. In order to provide space for the two side sash above the center one it was found necessary to put a small wood filling piece below the pipe bow. This piece need be only of a depth, including the thickness of pipe, sufficient to provide space for the two side sash and it will be an advantage to have them stow snugly. One of the side sash is hinged with narrow butts or flat hinges so that when folded it lays up close to the center sash. The other side is hinged with wider butts that project about a half inch above sash so that when folded it will clear the other one. The center sash is hinged at the top to the oak filling piece which is fastened to the pipe bow with quarter-inch flat head machine screws. These hinges or butts should be of the loose pin type, so that by pulling the two pins the entire front can be easily removed.



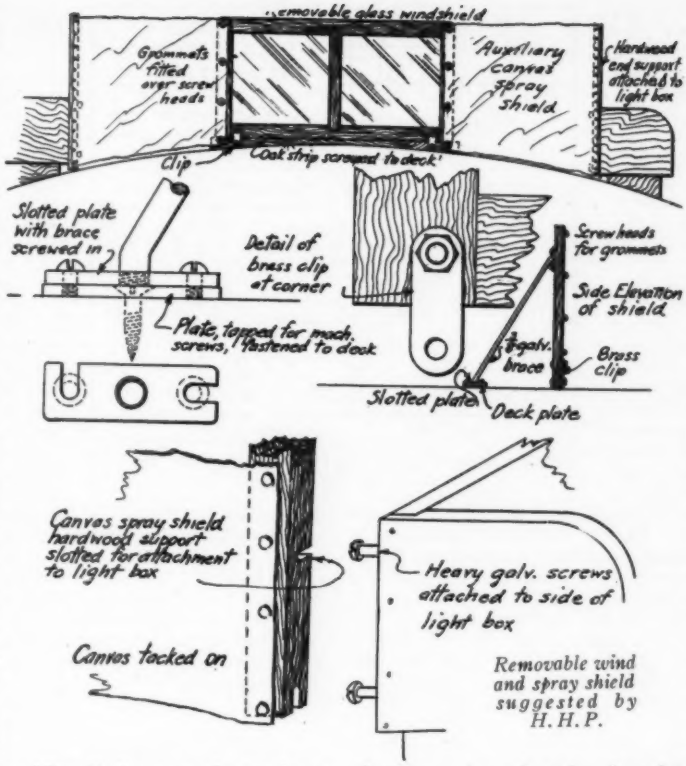
The triple-fold wind shield designed by C. H. C.

A spray board of sufficient height to clear the companion slide is shown below the sash. Where the deck has considerable crown it is best to straighten the upper edge of this board somewhat instead of following the exact curve of deck, as this makes the side sash short enough so they will swing to the center as well as improving the appearance.

Oak or mahogany

would be the most suitable wood for making the sash and the glass should be 3/16-inch plate. The sash should be mortised in the regular way at the corners and rabbitted as shown for the glass which is held in place with a small wood bead fastened with screws. Stock of 7/8-inch thickness should be heavy enough to provide the necessary strength where hardwood is used and careful work done. The center sash should be about 1 inch wider than the other, so as to provide necessary clearance when folded. The upper edge of sprayboard is either rabbetted or provided with a separate piece slightly projecting above its upper edge so as to provide a stop for the sash when in position. Ordinary metal buttons, preferably those mounted on a plate, can then be used to hold sash in place. They have the advantage of providing little or no obstruction to the folding of sash.

C. H. C., Saginaw, Mich.


removable glass windshield
Grommets fitted over screw heads
Auxiliary canvas spray shield
Hardwood end support attached to light box
Clip
Oak strip screwed to deck
Slotted plate with brace screwed in
Detail of brass clip at corner
Screw heads for grommets
Side Elevation of shield
Plate, tapped for mach. screws, fastened to deck
3/8 galv. brace
Brass clip
Slotted plate
Deck plate
Canvas spray shield hardwood support slotted for attachment to light box
Canvas tacked on
Heavy galv. screws attached to side of light box
Removable wind and spray shield suggested by H. H. P.

Removable Spray Guard

THE sketch shows an arrangement as actually used upon a small raised deck cruiser and, although the construction might be improved and refined besides modified for individual cases, this proved perfectly satisfactory during a number of years' use. The windshield was made of an oak frame with two glass panels and was about two feet wide, thus affording protection to the steersman, the wheel being in the center of the cabin bulkhead, while allowing plenty of space each side to climb upon the cabin top without having to get over the windshield. Although removable, we do not recollect of the frame ever having been removed, except perhaps during the spring overhauling. An oak strip, shaped to fit the curvature of the

(*Continued on page* 188)

Motor Boat Hauling Gear

How to Build and Construct an Inexpensive Hauling Rig, Designed Particularly For Small Clubs

Answer to the Following Question Published in the December Issue

"Explain the construction of a suitable motor boat hauling rig for a small boat club"

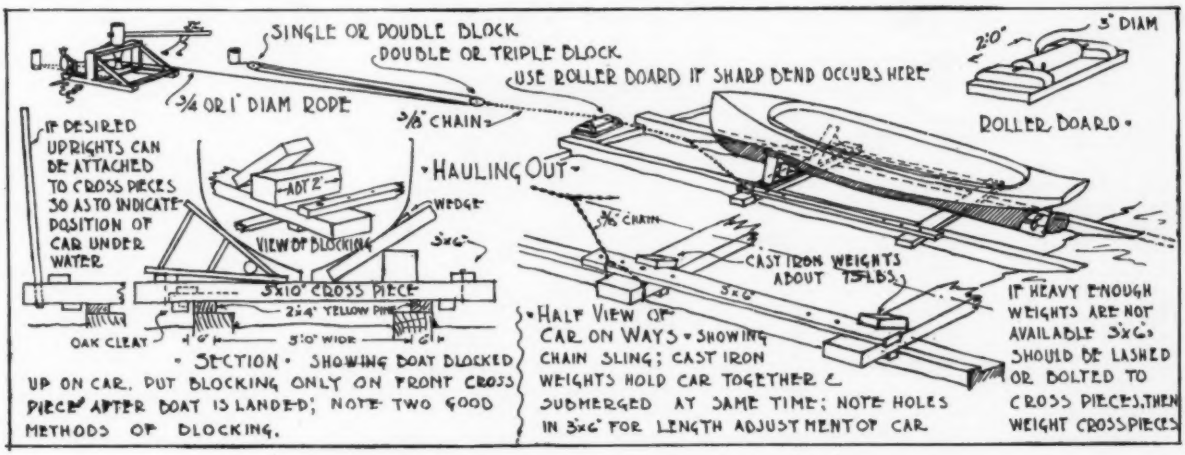
Hauling on Timber Skids

(The Prize-Winning Answer)

THE accompanying sketches and photographs show a very simple and satisfactory arrangement for hauling out boats of a fair size.

The ways consist of two yellow pine rails, about five feet apart, set on the beach projecting out under water. The rails must be eight inches or more above the beach so as to avoid having the car strike any projecting obstructions. More space is an advantage when it is necessary to get under a boat to caulk the garboard or to paint the bottom.

The car consists of two cross pieces, with an oak cleat at each end, with two fore and aft strips at each side to


SINGLE OR DOUBLE BLOCK
DOUBLE OR TRIPLE BLOCK
USE ROLLER BOARD IF SHARP BEND OCCURS HERE
3/4 OR 1" DIAM ROPE
5/8" CHAIN
2'0"
3" DIAM
ROLLER BOARD
IF DESIRED UPRIGHTS CAN BE ATTACHED TO CROSS PIECES SO AS TO INDICATE POSITION OF CAR UNDER WATER
HAULING OUT
ADZE
WEDGE
VIEW OF BLOCKING
5x6
5/8" CHAIN
CAST IRON WEIGHTS ABOUT 75 LBS.
5x10" CROSS PIECE
2 1/4" YELLOW PINE
OAK CLEAT
4'0"
5'10" WIDE
SECTION SHOWING BOAT BLOCKED UP ON CAR. PUT BLOCKING ONLY ON FRONT CROSS PIECE AFTER BOAT IS LANDED; NOTE TWO GOOD METHODS OF BLOCKING.
HALF VIEW OF CAR ON WAYS SHOWING CHAIN SLING; CAST IRON WEIGHTS HOLD CAR TOGETHER & SUBMERGED AT SAME TIME; NOTE HOLES IN 5x6 FOR LENGTH ADJUSTMENT OF CAR.
IF HEAVY ENOUGH WEIGHTS ARE NOT AVAILABLE 5x6's SHOULD BE LASHED OR BOLTED TO CROSS PIECES, THEN WEIGHT CROSS PIECES

Diagrammatic sketch by A. G. W. to illustrate his boat hauling gear

make the car the proper length. The strips are held to the cross pieces by means of four three-quarter-inch pins, one at each corner. The strips are provided with several holes so as to allow for adjustment in length of the car. This construction allows the car to be taken apart or put together under a boat without much difficulty. It is so simple it is an easy matter to have several of different sizes to suit the various boats to be handled. Note the dotted lines on the section showing a smaller cross piece for a small boat.

To haul out a boat, the rails are cleaned off and greased with a good heavy grease, a pound of Albany grease will go a long way. Care must be exercised to prevent sand from getting on the rails, as that would have the opposite effect of the grease. A tremendous weight can be moved quite easily on clean, properly greased skids without vibration or shock.

The car is now put together; the cross pieces placed the proper distance apart to take the boat; the car is weighted; the chain sling is fastened to the forward piece; if the boat is extremely heavy it is advisable at times to extend the sling to the aft cross piece, with a turn around the forward piece. This will prevent any possibility of the car coming apart should the rear cross piece get stuck for some reason.

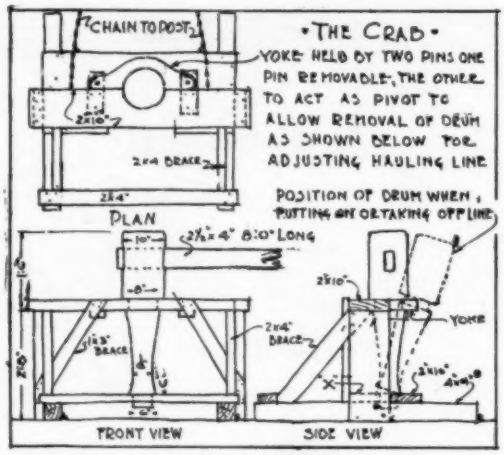
Now take a long pole and push the car into the water so the boat can float on; land the boat in the center; be sure to get the boat on far enough so as to distribute the weight equally on each cross piece, this will facilitate pulling and will also place a broad section of the boat over the forward piece and will permit good blocking. You can readly see if the boat does not get far enough on the car, most of the weight will be on the aft piece, the boat may just about balance there, and there may be danger of the car pulling apart unless the sling is also made fast to the rear piece; in the same case the section of the boat on the forward piece will probably be very sharp and the boat resting lightly at this point will make it difficult to block up properly.

After the boat is properly landed on the car, pull ahead so the boat will just about stand vertical; insert the blocking securely; pull car out of the water; throw off the weights, then go ahead.

The pulling rigging should not be too light; the blocks ought to be one double and one triple with a becket on each, this permits any combination of parts in the falls up to six parts as desired, according to the weight of the boat to be hauled.

Be sure to have good chain slings of ample strength so as to avoid any possibility of accident.

The simplest and cheapest hauling device is a crab such as the house movers use. A crab will pull a tremendous load without requiring much exertion on the part of the operators. The crab is made fast to a post with a chain, the ends are fastened around the bottom bearing piece marked X as shown. The hauling line is passed through the crab, with three turns around the drum, with some one to take in the slack.


"THE CRAB"
CHAIN TO POST
YOKE HELD BY TWO PINS ONE PIN REMOVABLE, THE OTHER TO ACT AS PIVOT TO ALLOW REMOVAL OF DRUM AS SHOWN BELOW FOR ADJUSTING HAULING LINE
2x4 BRACE
PLAN
POSITION OF DRUM WHEN PUTTING ON OR TAKING OFF LINE
2x4" x 8'-0" LONG
2x10"
YOKE
2x4" BRACE
FRONT VIEW
SIDE VIEW
Supplementary detail by A. G. W. of the crab or hauling device

Other methods of pulling may be used such as a half dozen husky men, but their power may be applied too suddenly at times and may rupture some part of the rigging, allowing the boat to slide back again; a team of horses; an automobile; there are several good gasoline hoists with a geared nigger head on the market or if some of the club members have the facilities and the mechanical ability they may rig one up themselves.

By having a pair of yellow pine skids about 3 x 5 inches, eighteen feet long, a boat may be moved to any part of the yard with very little trouble.

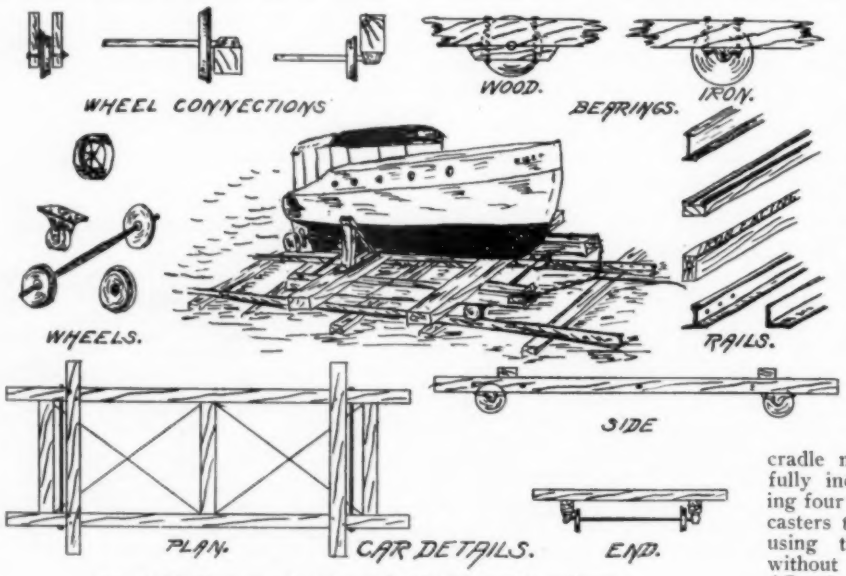
Should it be necessary to stop on an incline to change the rigging, be sure to chock the car in some way to prevent it from sliding back.

A. G. W., College Point, N. Y.

Hauling Out Made Easy

HAULING out is generally the least agreeable part of motor boating. The boating season is at an end and we feel that there is much hard work ahead before we can again enjoy the moonlight. A damaged propeller or a leak may make hauling necessary, but whatever the occasion, it is a job we are all glad to see finished, and anything to facilitate the operation is worthy of attention. Hauling out without a marine railway of some sort is possible, but with even an improvised marine railway the job may be quickly and easily accomplished.

The amount of time and expense required for the construction of a practical hauling rig depends largely upon the lay of the land and the number and size boats to be hauled. The simplest rig for hauling two or three small boats is a cradle or skids to fit the boats and greased planks having strips nailed to the sides, to prevent the cradle from running off, for tracks. The track is spaced with boards nailed to the under side and but two sections are necessary as they can be moved along. A block and tackle or a motor truck will do the pulling. The sliding qualities of the cradle may be wonderfully increased by bolting four heavy stationary casters to each side and using the same track without grease. The



W. B. M. illustrates the conventional type marine railway

(*Continued on page* 188)

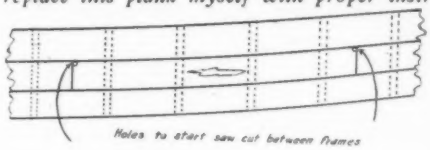
The Way We Would Do It

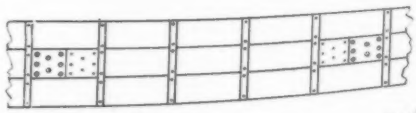
Conducted by F. W. Horenburger and A. E. Snyder

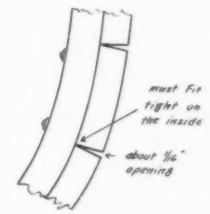
EVERY month MoToR BoatinG's staff of experts answers thousands of inquiries about boats, engines, accessories and, in fact, everything marine. There is hardly a branch of the sport or industry on which they are not constantly being asked to give their opinions. They are very glad to do this, as well as to be of whatever service they can to MoToR BoatinG's subscribers and readers.

Quite naturally, many requests for information are received on subjects which are not of universal interest to every motor boatman. This, as well as the fact that it would be a physical impossibility to print answers to all questions received, makes it necessary for us to follow the rule of only printing answers to the few most important and interesting questions. However, we always give a reply by mail, so if you are perplexed about any questions pertaining to boating don't hesitate to write "The Way We Would Do It" Editor.

DURING a recent storm my boat broke away from her moorings and drifted quite some distance before it was picked up again. During this trip it came into collision with something which stove in a plank in the forward part of the boat. I would like to ask if I could replace this plank myself with proper instructions. I am quite handy with tools and believe I could make a good job if the method was outlined. The boat is now hauled out, awaiting this repair. M. O. C., Charleston, S. C.





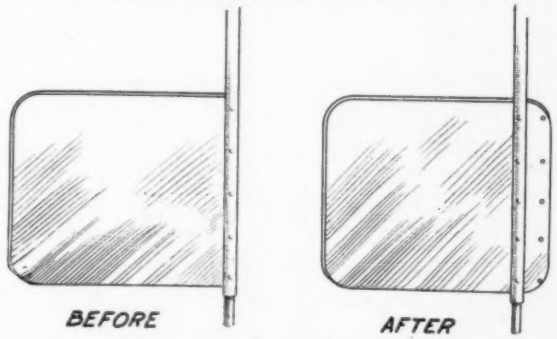


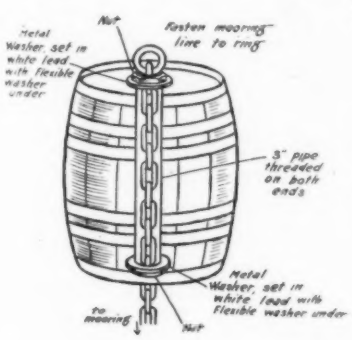
The method of repairing a broken plank is quite simple. It is necessary to make a careful inspection of the hull in the vicinity of the break in order to determine whether all the frames are still sound. The method is to drill small holes in the top edge of the broken plank about the third frame space each side of the injury. These are enlarged by straight saw cuts through the plank so as to separate it from the remainder. The broken portion is then removed and all old fastenings in between are carefully driven out. If possible, attempt to preserve the broken plank in order to use it as a templet from which to cut the new one. Should it be necessary a paper pattern of the opening can be made on heavy building paper. A new plank cut to this shape would fit the opening properly. Butt blocks of oak about one inch wider than the plank and one and one-quarter times as thick and long enough to fit snugly between the frames are now prepared. These are screw fastened to the ends of the old plank of the inside on the hull. The new plank is fitted carefully to the opening and then fastened to the butt block at one end. It is then bent in to the frames and the other butt being secured with brass screws at each frame and the end block. After being planed off smoothly it can be caulked and painted as usual.

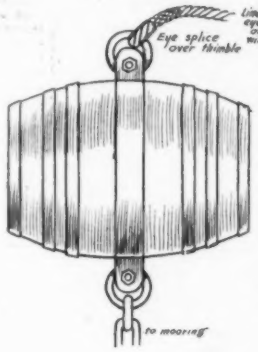
* * *

Can you tell me the best way in which to arrange a mooring buoy to be constructed from a barrel? I have seen these floating on end and on their sides and want to know which is the best. How would the mooring chain be secured to the barrel? Kindly illustrate the construction and tackle arrangement necessary. S. B. T., Nyack, N. Y.

Of the several ways of attaching a mooring line to a barrel float we much prefer the type in which the chain is made to pass through a pipe running through the central axis of the barrel. This type of buoy presents less sharp edges to injure the boat when the buoy comes in contact with it. A piece of 2½-inch galvanized pipe is threaded at both ends and inserted through a hole in both heads of the barrel. A rubber gasket under a large washer and a locknut at each end will hold it securely and at the same time render it water-tight. The chain can be passed through this pipe and a large ring at the top end will prevent it from running back. The other method of attaching a wrought iron strap is favored by some also. This is simply a pair of 2-inch by ⅜-inch straps bent to shape and secured by substantial bolts. Rings are slipped in between the ends of the strap and the chain secured as shown. Unless the ends of the barrel are well protected, the sharp edges of the hoop will mar the hull where it comes in contact with it.




Nut
Fasten mooring line to ring
Metal Washer, set in white lead with flexible washer under
3" pipe threaded on both ends
Metal Washer, set in white lead with Flexible washer under
Nut
to mooring



* * *

My 30-foot cruiser is very hard to steer and it is difficult to keep a tiller line for more than a short time without breaking it. Also the boat does not turn at all well. The rudder at present is about 16-inches square and is riveted to a split rudder stock with all of the blade area behind the stock. S. Y. C., Poughkeepsie, N. Y.

(*Continued on page* 184)

Piston Displacement of Four Cycle American Marine Motors

Tabulation of All American Marine Motors With Piston Displacements of Less Than 1500 Cubic Inches Arranged According to Cylinder Capacity

Motors Under 150 Cubic Inches

Piston Displacement	Motor	Rated H. P.	Bore & Stroke
24.74	Palmer	2	1-3 x3½
29.04	Regal	2	1-3¼x3½
43.30	Regal	4	1-3½x4½
44.18	Kermath	3	1-3¼x4
48.11	Barber	1	1-3½x5
49.70	Liberty Kid	3½	1-3¾x4½
49.70	Doman	4	1-3¾x4½
55.22	Fisherman	4	1-3¾x5
56.52	Buffalo	* 4	2-3 x4
70.93	Automatic	3	1-4⅛x5
71.57	Palmer	3½	1-4⅛x4½
79.52	Anderson	4	1-4½x5
79.52	Carl	4	1-4½x5
87.47	Regal	5	1-4½x5½
87.88	Universal	12	4-2⅛x4
88.36	Kermath	8	2-3¼x4
88.36	Roberts	8	2-3¼x4
88.60	Frisbie	5	1-4¾x5
95.04	Red Wing	14	4-2¾x4
95.43	Palmer	4½	1-4½x6
96.22	Buffalo	* 6	2-3½x5
98.92	Sterling	10	4-2⅝x4½
99.40	Liberty Kid	8	2-3¾x4½
99.40	Gray	*12	2-3¼x4½
103.08	Knox	6	1-5 x5¼
106.32	Doman	7	1-4¾x6
113.10	Regal	8	2-4 x4½
117.81	Carl	5	1-5 x6
117.81	Palmer	6 ➡	1-5 x6
117.81	Fisherman	6	1-5 x6
117.81	Peerless	6	1-5 x6
117.80	Domane	* 7	1-5 x6
127.24	Palmer	16	4-3 x4½
136.14	Palmer	6½	1-5½x6
138.08	Doman	12	4-3½x4½
141.30	Guarantee	7	1-6 x5
141.86	Automatic	6	2-4½x5
142.55	Wolverine	5	1-5½x6
143.14	Palmer	7	2-4½x4½
148.50	Knox	8	1-5½x6½
149.32	Fay & Bowen	17	4-3¼x4½

Motors from 150 to 300 Cubic Inches

150.80	Ralaco	* 8	2-4 x6
151.53	Vulcan	5	1-5½x7
153.92	Kermath	12	4-3½x4
153.92	Callie	14	4-3½x4
153.92	Scripps	*20	4-3½x4
154.43	Regal	7	1-5½x6½
159.04	Carl	8	2-4½x5
159.04	Anderson	8	2-4½x5
159.04	Honest Clay	8	2-4½x5
165.92	Wisconsin	18	4-3¼x5
166.31	Automatic	6	1-5½x7
166.31	Honest Clay	6	1-5½x7
168.79	Frisco Standard	5	1-5¾x6½
169.65	Frisbie	7	1-6 x6
170.24	Scripps	18	2-4½x6
173.20	Red Wing	20	4-3½x4½
174.94	Regal	10	2-4½x5½
176.72	Cady of Canastota	16	4-3¾x4
176.72	Kermath	18	4-3¾x4
177.20	Frisbie	10	2-4¾x5
187.76	G. B. S.	18	4-3¾x4¼
190.86	Palmer	11	2-4½x6
192.44	Fay & Bowen	*22	4-3½x5
192.44	Knox (V-H)	20	4-3½x5
192.44	Gray	25	4-3½x5
194.92	Niagara	12	2-4¾x5½
198.80	L-A	14	2-4¾x4½
198.80	Motorgo	16	4-3¾x4½
198.80	Gray	*24	4-3¾x4½
201.08	Kermath	25	4-4 x4
206.16	Knox	12	2-5 x5¼
209.54	Red Wing	24	4-3¾x4¾
212.64	Frisco	8	2-4¾x6
212.64	Doman	15	2-4¾x6
214.71	Palmer	10	3-4½x4½
220.88	Buffalo	20	4-3⅞x5
220.88	Wisconsin	22	4-3⅞x5
226.20	Speedway	28	4-4x4½
228.20	Oswald	5	4-4 x4½
230.10	Acme	8	1-6½x7
232.28	Honest Clay	9	1-6½x7
232.28	Regal	12	2-5 x4
235.62	Palmer	11	2-5 x6
235.62	Carl	12	2-5 x6
235.62	Anderson	12	2-5 x6
235.62	Fisherman	12	2-5 x6
235.62	Peerless	9	3-4½x5
238.56	Automatic	15	2-6½x7½
240.58	Vulcan	*25	4-3¾x5½
243.00	Capitol	*25	4-3¾x5½
243.00	Sterling	24	4-4 x5
251.31	Wisconsin	20	4-4x
251.32	Brennan	12	2-5 x6½
255.26	Buffalo	12	2-5 x6½
255.26	Standard	8	1-6½x8
255.36	Carl	36	4-4 1-16x5
259.40	Red Wing	*28	4-4 x5¼
263.88	Fay & Bowen	18	3-4¼x5
265.80	Frisbie	10	1-7 x7
269.39	Guarantee	12	2-5 3/16x6½
274.82	Lathrop	*15	2-5 x7
274.90	Ralaco	*25	4-4 x5½
276.48	Standard	14	2-5¼x6½
281.42	Regal	*16	4-4¼x4
283.52	Kermath	30	4-4¼x5
283.72	Wisconsin	12	2-5½x6
285.10	Guarantee	15	3-4½x6
286.29	Palmer	30	6-3¼x5
288.66	Ultra Six	16	2-5½x6¼
297.00	Knox		

Piston Displacement	Motor	Rated H. P.	Bore & Stroke
301.60	Ralaco	*16	4-4 x6
301.60	Peerless	20	4-4 x6
301.60	Gray	35	4-4 x6
301.60	Erd	20	4-4 x6
303.06	Vulcan	10	2-5¼x7
308.86	Bridgeport	14	2-5½x6½
308.86	Lathrop	16	2-5½x6½
309.25	Honest Clay	10	1-7½x7
312.12	Capitol	60	4-4¼x5½
318.08	Carl	18	4-4½x5
318.08	Red Wing	40	4-4½x5
330.72	Sterling	*35	4-4¾x5½
332.62	Automatic	12	2-5¼x7
332.62	Sterling	15	2-5½x7
332.62	Honest Clay	12	2-5½x7
340.30	Frisbie	16	2-6 x6
340.48	Stearns	45	4-4¼x6
340.48	Erd	30	4-4¼x6
340.48	Scripps	50	4-4¼x6
349.88	Regal	20	4-4½x5½
349.88	Fay & Bowen	40	4-4½x5½
349.88	Speedway	44	4-4½x5½
353.43	Palmer	18	3-5 x6
353.43	Fisherman	18	3-5 x6
354.40	Buffalo	30	4-4¾x5
354.40	Frisbie	30	4-4¾x5
360.87	Vulcan	25	3-6½x7¼
363.56	Peerless	24	2-5¾x7
375.52	Vulcan	22	3-7½x8½
381.72	Palmer	20	4-4½x6
381.72	Stearns	65	4-4½x6
381.72	Sturtevant	75	4-4½x6
389.84	Niagara	35	4-4¾x5½
389.84	Fay & Bowen	40	4-4¾x5½
389.84	Wisconsin	40	4-4¾x5½
392.72	Brennan	40	4-5 x5
395.84	Frisco Standard	12	2-6 x7
395.84	Doman	25	2-6 x7
395.84	Guarantee	16	2-6 x7
395.84	Union	12	2-6 x7
397.60	Kermath	40	4-4½x6¼

Motors from 400 to 500 Cubic Inches

403.20	Vulcan	16	4-4½x6
412.20	Lathrop	21	3-5 3/16x6½
424.12	Buffalo	15	2-6 x7½
425.28	Erd	45	4-4½x6
425.28	J. V. B.	40	4-4¾x6
425.28	Gray	45	4-4¾x6
425.28	Doman	40	4-4¾x6
425.28	J. V. B.	60	4-4¾x6
425.28	Wisconsin	42	6-4¼x5
431.96	Knox (V-H)	40	4-5 x5½
449.48	Wisconsin	46	4-5.1x5½
452.40	Carl	14	2-6 x8
452.40	Mianus	16	2-6 x8
452.40	Standard	18	2-6 x8
460.20	Acme	25	2-6¼x7½
460.20	Acme	16	2-6¼x7½
460.20	Frisco Standard	16	2-6¼x7½
463.29	Lathrop	30	3-5½x6½
464.56	Honest Clay	16	2-6½x7
464.56	Wolverine	14	2-6½x7
471.24	Anderson	24	4-5 x6
471.24	Carl	24	4-5 x6
471.24	Palmer	24	4-5 x6
471.24	Peerless	35	4-5 x6
477.12	Brennan	40	6-4½x5
481.16	Vulcan	30	4-6½x7¼
490.88	Fay & Bowen	45	4-5 x6¼
497.76	Regal	18	2-6½x7½
498.93	Automatic	18	3-5½x7

Motors from 500 to 700 Cubic Inches

508.95	Frisbie	25	3-6 x6
508.96	Gray Prior	36	4-4½x8
510.52	Buffalo	24	4-5 x6½
510.52	Standard	24	4-5 x6½
510.72	Carl	16	2-6⅝x8
510.72	Palmer	18	2-6⅝x8
510.72	Scripps	45	6-4¼x6
522.68	Guarantee	75	4-5½x5½
524.82	Speedway	66	6-4½x5½
524.82	Regal	32	6-4½x5½
524.82	Fay & Bowen	50	6-4½x5½
526.60	Frisbie	50	6-4¾x5
536.36	Stearns	90	4-5½x6½
538.78	Guarantee	20	2-7 x7
549.80	Automatic	30	4-5 x7
549.80	Hall-Scott	125	4-5 x7
549.80	Peerless	125	4-5 x7
549.80	Ralaco	*30	4-5 x7
550.16	Lathrop	28	4-5 3/16x6½
563.28	Vulcan	35	3-7½x8½
564.12	Twentieth Century	20	2-6½x8½
570.20	Brennan	60	4-5½x6
582.72	Elco	65	4-5 9/16x6

Motors from 500 to 700 Cubic Inches

Piston Displacement	Motor	Rated H. P.	Bore & Stroke
584.76	Wisconsin	55	6-4¾x5½
608.12	Vulcan	20	4-5¼x7
608.12	Wisconsin	54	4-5¼x7
615.76	Knox	25	2-7 x8
617.72	Regal	30	4-5¼x6½
617.72	Lathrop	40	4-5½x6½
618.50	Honest Clay	20	2-7½x7
621.00	Sterling	150	6-4 11/16x6
623.20	Van Blerck	100	4-6¾x6
641.48	Sterling	55	4-5½x6¾
665.24	Automatic	24	4-5½x7
665.24	Honest Clay	25	4-5½x7
665.24	Automatic	40	4-5½x7
665.24	Wolverine	40	4-5½x7
665.24	Wisconsin	40	4-5½x7
665.24	Buffalo	57	4-5½x7
674.22	Wisconsin	60	4-5½x7
678.50	Mianus	65	6-5.1x5½
678.60	Standard	24	3-6 x8
678.60	Frisbie	27	3-6 x8
678.60	Brennan	40	4-6 x6
690.30	Acme	80	4-6 x6
690.30	Frisco Standard	25	3-6¾x7½
690.30	Acme	25	3-6¼x7½
692.72	Buffalo	40	3-6¼x7½
696.84	Wolverine	22	2-7 x9
		22	3-6½x7

Motors from 700 to 1000 Cubic Inches

701.04	Sterling	150	4-5¾x6¼
727.12	Wisconsin	62	4-5¾x7
727.12	Speedway	75	4-5¾x7
727.12	Peerless	50	4-5¾x7
736.32	Fay & Bowen	65	6-5 x6¼
743.04	Acme	20	2-7¼x9
743.24	Frisco Standard	20	2-7¼x9
746 64	Bridgeport	30	3-6½x7½
751.04	Vulcan	45	4-7½x8½
766.08	Palmer	26	3-6¾x8
795.20	Doman	50	4-6 x7
795.20	Union	20	2-7½x9
796.38	Automatic	25	2-7½x9
824.70	Frisco	30	3-6½x8
824.70	Automatic	45	6-5x 7
824.70	Hall-Scott	200	6-5 x7
824.70	Peerless	250	4-5 x7
824.70	Ralaco	*45	6-5 x7
848.24	Buffalo	30	4-6x 7½
859.04	Niagara	80	4-6¼x7
874.08	Elco	100	6-5 9/16x6
883.56	Palmer	25	2-7½x10
904.80	Mianus	32	4-6 x8
904.80	Standard	37	4-6 x8
909.18	Wisconsin	80	6-5¼x7
909.18	Vulcan	40	6-5¼x7
920.40	Acme	40	4-6¼x7½
920.40	Acme	55	4-6¼x7½
929.12	Honest Clay	35	4-6½x7
934.80	Van Blerck	150	6-5¾x6
962.22	Sterling	125	6-5½x6¼
995.52	Regal	36	4-6½x7½
997.86	Automatic	60	6-5½x7
997.86	Wisconsin	85	6-5½x7

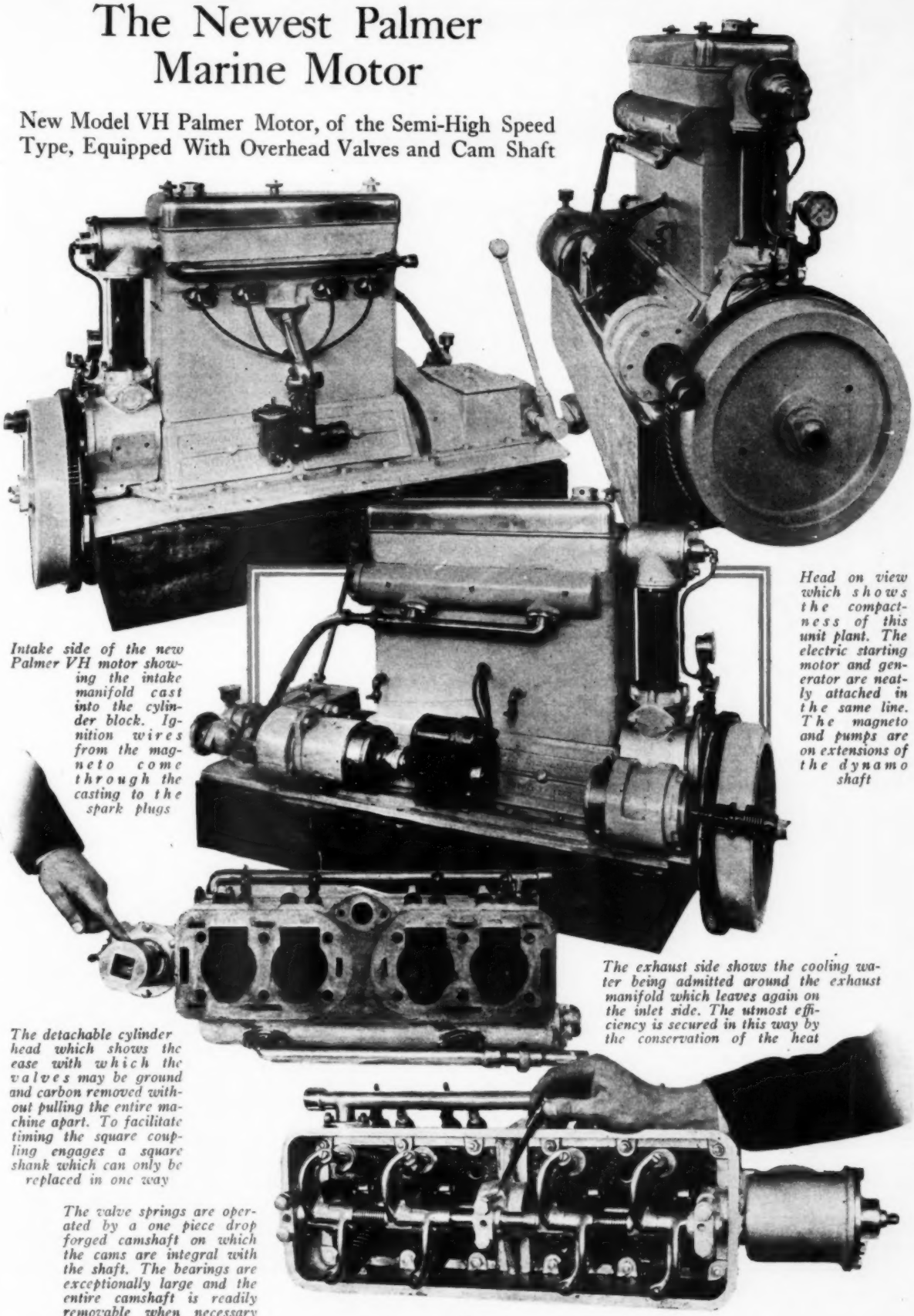
Motors from 1000 to 1500 Cubic Inches

1017.90	Frisbie	75	6-6 x6
1021.44	Palmer	35	4-6¾x8
1021.44	Carl	36	4-6¾x8
1056.68	Sterling	225	6-5¾x6¾
1061.84	Automatic	50	4-6½x8
1061.84	Standard	60	4-6½x8
1069.20	Acme	27	2-8¼x10
1090.68	Wisconsin	90	6-5¾x7
1090.68	Speedway	150	6-5¾x7
1099.60	Hall-Scott	300	8-5 x7
1099.60	Peerless	450	8-5 x7
1114.56	Acme	35	3-7¼x9
1126.56	Vulcan	70	6-7½x8¼
1128.24	Twentieth Century	50	4-6½x8¼
1134.92	Honest Clay	50	2-8½x10
1192.80	Wolverine	32	3-7½x9
1192 80	Automatic	37	3-7½x9
1192.80	Bridgeport	45	3-7½x9
1192 80	Union	35	3-7½x9
1231.52	Knox	50	4-7 x8
1237.00	Honest Clay	50	4-7½x7
1246.20	Van Blerck	200	8-5¾x6
1288.24	Buffalo	80	4-6¾x9
1308.48	Anderson	50	4-7 x8½
1308.48	Guarantee	50	4-7 x8½
1325.24	Palmer	35	3-7½x10
1357.20	Standard	54	6-6 x8
1380.60	Acme	65	6-6¼x7½
1385.44	Buffalo	45	4-7 x9
1380.60	Acme	80	6-5¼x7½
1402.08	Sterling	300	8-5¾x6¾
1454.24	Speedway	200	8-5¾x7
1486.08	Acme	50	4-7¼x9

* Discontinued sizes.

The Newest Palmer Marine Motor

New Model VH Palmer Motor, of the Semi-High Speed Type, Equipped With Overhead Valves and Cam Shaft



Intake side of the new Palmer VH motor showing the intake manifold cast into the cylinder block. Ignition wires from the magneto come through the casting to the spark plugs

Head on view which shows the compactness of this unit plant. The electric starting motor and generator are neatly attached in the same line. The magneto and pumps are on extensions of the dynamo shaft

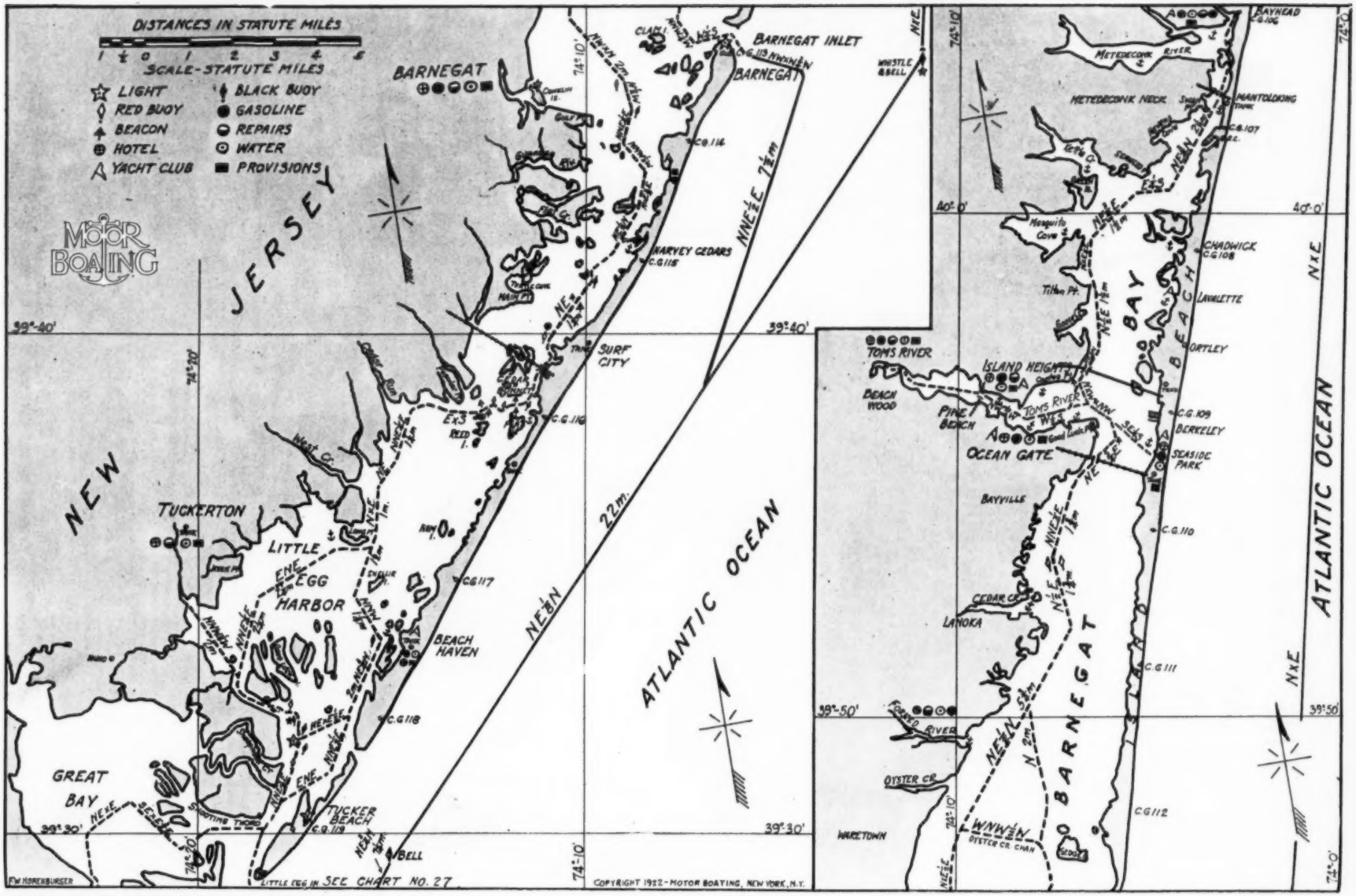
The exhaust side shows the cooling water being admitted around the exhaust manifold which leaves again on the inlet side. The utmost efficiency is secured in this way by the conservation of the heat

The detachable cylinder head which shows the ease with which the valves may be ground and carbon removed without pulling the entire machine apart. To facilitate timing the square coupling engages a square shank which can only be replaced in one way

The valve springs are operated by a one piece drop forged camshaft on which the cams are integral with the shaft. The bearings are exceptionally large and the entire camshaft is readily removable when necessary

Motor Boatmen's Chart No. 28, New Jersey Coast—Little Egg Inlet to Bayhead

For Use in Connection With Coast and Geodetic Survey Chart No. 1216



Cruising on Barnegat Bay

A Description of the Intricate Channels on the Waters From Little Egg Inlet Back of the Jersey Coast Through Barnegat Bay to Bayhead

IN cruising the New Jersey Coast from Little Egg Inlet north on the outside, the course from the bell buoy off Tucker Beach Light is N E ⅛ N, a distance of 22 miles to Barnegat Buoy. If going in the Inlet at Barnegat, follow the previous course until off Surf City, then N N E ½ E for 7½ miles, which brings you to the entrance of the Inlet about 2 miles off shore. Head in toward the Coast Guard House until a scant half mile from shore on a course N W x W ¾ W. Then turn into the Inlet Channel N N W ¼ W until abeam of the lighthouse. The course is then shifted to W ¼ S for 1 mile which brings you into the Bay.

Coming up from Little Egg Inlet on the inside, the first objective would be either the town of Tuckerton or Beach Haven. Tuckerton is one of the oldest towns in the state of New Jersey and is a quaint old place, the home of many fishermen and baymen who sail these waters. After leaving Shooting Thorofare, sail N N E ¾ E for 1½ miles to a N red buoy off Sheepshead Creek. Then N x E ¾ E for ¾ of a mile to a red and black buoy which marks the Y in the Channel. The west turn will take you to Tuckerton as indicated on the chart and the east turn to Beach Haven and points to the north. In going into Tuckerton, the staked channel is followed and a draft of 40 inches can be carried in mid-channel up to the town. All sorts of supplies and provisions are available as well as marine railways and repair facilities. In going to Beach Haven from the Y mentioned before the course N E x E ½ E is followed to a point close to the shore from where a course N E ¾ N is followed for about 2 miles. A channel to the Beach Haven Yacht Club will be found marked by barrels on tripods which mark the entrance on each side. This channel has several turns and is about half a mile long to the dock. Plenty of water will be found between the marks and visitors will always be made welcome at the Beach Haven Yacht Club. One can either lie at the wharf or anchor in the stream. Stores and supplies are available and ice can also be obtained. A water tap is convenient on the club dock.

Leaving Beach Haven, follow a course N N W for a mile and a quarter, then N N E ¾ E to Long Point. From here turn N x E for one mile to a spar off West Creek, then N E for ¾ of a mile to another spar, then N N E ¼ E for a mile and a quarter to a spar off Cedar Run. From here the channel turns on an easy curve until a course E x S brings you to a crooked channel through Cedar Bonnet. This is perhaps about as difficult a channel as will be found anywhere, but it is well marked by many stakes. Those on the port bank are marked on the upper end with red crosses. Those on the starboard bank are marked by black triangles. By keeping between these and observing that every port turn is marked by a red spar and every starboard turn by a black spar one will not go astray. Mid-channel position is marked by black and white vertical striped buoys at the turns and at frequent points. Two drawbridges between Ship Bottom and Surf City will be opened when necessary and if it is desired to go to Manahawken it is best to anchor below the draw and go over by road, as the creek is quite shallow.

From Surf City the course N E between stakes and then a length of curved channel will bring one to a point opposite Harvey Cedars. Good anchorage can be found here and some excellent water, but it will be necessary to take this off in a small boat. Leaving here head N E ½ N, then N x E ¾ E and N N W ½ W to a small island off Sloop Sedge. From here head N N E ¼ E and follow between channel marks further on the several courses indicated to what is known as the Waretown Channel which brings one to the west of the flats in deep water with the Waretown Hotel straight ahead and the Barnegat Light abeam.

To get into Barnegat City after leaving the Waretown Channel turn S W x W ¼ W to the mouth of Double Creek. This can only be followed a short distance to the roadway There are here a hotel, stores, and boat shop as well as an anchorage and hotel at Waretown. The Waretown Channel is marked with spar buoys at the points where the course is shifted. Numerous good anchorages can be found hereabout at the mouth of Sheepshead Creek, back of Barrel Island and between Johnny Sedge and a small marsh island just below Barrel Island.

To continue further up the bay a course of N x E ½ E is followed for about 2½ miles to a point about ½ mile from shore and close to the Oyster Creek Channel buoy. To cross to the east side of the bay by this channel head E S E ½ E from the first red spar. On leaving this channel the way out through Barnegat Inlet to the sea is indicated. Good anchorages can be found in abundance and for those who like clamming there are many to be had on the flats close by. Going northward a channel known as Mud Channel is followed. It begins off Sedge Island and heads about for Cedar Point. It is practically straight, the slight turns being marked by red and black stakes.

From the red buoy at Oyster Creek the course N E ½ N for practically 5¾ miles will bring one to Cedar Creek. From here a well marked channel continues to the draw bridge at Ocean Gate. Good anchorages can be found in all the small creeks which discharge into the bay in this vicinity. Just beyond this drawbridge is the entrance to the Toms River which can be followed to the village of Toms River. In sailing these waters at night the bearings can be made on the lights of the Yacht Clubs and the three drawbridges. The club lights are on their flag poles and are kept lighted throughout the night. On leaving the railroad bridge the course is somewhat crooked and the chart will show the general compass courses to follow. All the changes from here to Bayhead are marked with stakes arranged as a tripod with barrels on top painted either red or black according to the way the channel turns. Yellow buoys, which are on these waters of the bay and Toms River, mark race courses and are not aids to navigation.

In going to the Yacht Club at Seaside Park a course of S E ¼ S is followed from Good Luck Point to the ferry dock. It is necessary to pass between red and black markers to make the dock. In going to the Yacht Club turn to port and run slowly.

If going up Toms River from the point, after passing black tripod, Toms River Coast Guard Station off the beam, head W x N until off Wanamaker Barracks at Island Heights then turn W ½ S towards the dock at Ocean Gate Yacht Club in order to clear the bar off Long Point, the end of which is marked with a red buoy. When about midway between the Yacht Dock and the red barrel head N W ½ W for the drawbridge. After passing through the draw keep about mid-stream until well up the river inclining towards the south shore. At the turn just off Beachwood pick up a red and a black spar, these are very small marks, follow around the north shore. The River can be followed to the highway bridge which is about the center of the town. There is no better place north of Tuckerton to buy supplies, etc. First class boat shops and railways are located here and at Island Heights. At Island Heights the shops are located between Long Point and the Ferry Dock.

Going north from Good Luck Point run N W then N x W to off Coates Point, head for the highway draw N E ¼ N and pass through. A course N ½ E for 1½ miles will bring you to a point off Tilton Point. The water over the east side of the bay is very shoal and the Lavalette Yacht Club have a marked channel leading to their dock.

Following the courses indicated and watching carefully the channel marks the course to the drawbridge at Mantoloking can be followed without great difficulty. After passing through the draw run ¾ of a mile N N E ½ E passing between the island and the beach shore. Then run N x W ⅜ of a mile from where you head N N E ¾ E directly to the dock of the Bayhead Yacht Club, which is as far as one can get on Barnegat Bay.

Material Lists for Building Boats in MoToR BoatinG's Series

Detailed Tabulation of All Material Needed for Building the Second Six Boats Designed by Wm. J. Deed During the Past Year

ITEM	PENGUIN 25-Ft. Auxiliary Sloop	WHALE 20-Foot Cruiser	SEA GULL 41-Foot Schooner	TARPON 29-Foot Cruiser	ALLIGATOR 28-Ft. Tunnel Stern Cruiser	MUD TURTLE 30-Ft. Stern Wheel Cruiser
Raised Deck Clamp		2 pcs. 13′x3″x1″	2 pcs. 18′x2″x⅝″	2 pcs. 17′x1¼″x3″		
Main Sheer Clamp	2 pcs. 27′x4½″x1⅛″	2 pcs. 22′x4″x1″	2 pcs. 43′x2″x7″	2 pcs. 32′x1¼″x4½″	2 pcs. 30′x3″x1¼″	2 pcs. 30′x3″x1¼″
Hatches or Box over Motor	7 sq. ft. of 1″ 1 pc. 3′ 6″x1½″x1½″	Bridge Deck Beams 5 pcs. 4′ 9″x1⅛″x1¾″		Bridge Deck Beams 7 pcs. 9′x1½″x2″	10 sq. ft. of 1″	8 sq. ft. of 1″
Hatches or Box over Motor	6 pcs. 3′ 6″x1½″x1½″ 2 pcs. 2′ 3″x1½″x1″	Bridge Top 9 sq. ft. of 1″		Bridge Deck 27 sq. ft. of ⅞″	10 pcs. 36″x1½″x1¾″	7 pcs. 36″x1⅛″x1¾″
Hatches or Box over Motor	1 pc. 3′ 9″x1½″x1″ 10 sq. ft. of ½″ T G & V	Bridge Deck Front 13 sq. ft. of ¾″ T G & V		Bridge Deck Front 9 sq. ft. of ⅞″ T G & V	2 pcs. 24″x1⅛″x1¾″ 10′x1″x2″	4 pcs. 36″x1″x2″
Companionway	2 pcs. 6′x3″x1¼″ 1 pc. 8′ 6″x2″x⅜″ 3 pcs. 2′ 8″x2″x1⅛″	2 pcs. 5′ 6″x3″x1⅛″ 6 sq. ft. of 1⅛″ 2 pcs. 2′x1½″x1¼″ 1 pc. 2′x2″x1⅛″ 6′ of 3″x⅜″	2 pcs. 6′x3″x1⅛″ 1 pc. 8′ 6″x2″x⅜″ 3 pcs. 2′ 8″x2″x1⅛″	5 pcs. 36″x1¼″x1¼″ 1 pc. 2′ 3″x3″x1½″ 2 pcs. 36″x4″x1½″ 7 sq. ft. of 1⅛″	2 pcs. 6′ 6″x3″x1″ 8 sq. ft. of ¾″ 4 pcs. 2′x1″x1″	2 pcs. 6′ 6″x3″x1″ 8 sq. ft. of ¾″ 1 pc. 2′ 2″x2″x1″ 2 pcs. 2′ 2″x1″x1″
Companionway Door	4 pcs. 3′x3½″x1″	2 pcs. 18″x13″x⅝″	3 pcs. 2′ 6″x4″x1⅛″	3 pcs. 36″x3½″x⅞″	4 pcs. 5′ 4″x4″x⅞″	2 pcs. 4′ 6″x4″x⅞″ 1 pc. 4′ 6″x3″x⅞″
Companionway Door	4 pcs. 1′ 4″x3½″x1″	1 pc. 1′ 10″x6″x1⅛″	1 pc. 2′ 2″x6″x1⅛″	2 pcs. 24″x3½″x⅞″	2 pcs. 24″x4″x⅞″ 1 pc. 24″x6″x⅞″	2 pcs. 2′ 0″x3″x⅞″ 1 pc. 2′ 0″x6″x⅞″
Companionway Door	2 pcs. 1′ 4″x4½″x1″	2 pcs. 1′ 10″x4″x1⅛″	1 pc. 2′ 2″x4″x1⅛″	1 pc. 24″x5″x⅞″	2 pcs. 2′ 8″x6″x⅜″	2 pcs. 20″x7″x⅜″
Companionway Door	4 pcs. 10″x14″x⅜″	2 pcs. 4′x4″x1⅛″	2 pcs. 24″x7″x⅝″	4 pcs. 15″x8″x⅜″	2 pcs. 1′ 9″x6″x⅜″	2 pcs. 22″x7″x⅜″
Companionway Jambs	2 pcs. 3′x3″x1⅛″	2 pcs. 4′x2½″x1″	2 pcs. 2′ 6″x3″x1⅛″	2 pcs. 36′x2½″x1″	2 pcs. 5′ 4″x3″x1″	2 pcs. 4′ 6″x3″x1″
Companionway Sill	1 pc. 2′ 8″x3″x1⅛″	1 pc. 1′ 10″x2½″x1¼″	1 pc. 2′ 2″x3″x1⅛″	1 pc. 24″x2½″x1″	1 pc. 2′ 2″x3″x1½″	1 pc. 2′ 2″x3″x1″
Raised Deck Ribband		2 pcs. 13′ of 1¼″ Half Rd.	2 pcs. 18′x1¼″ Half Rd.	2 pcs. 20′x1¼″ Half Rd.		
Cockpit Coaming	40 sq. ft. of ¾″ T G & V		2 pcs. 12′x18″x1″		2 pcs. 12′x17″x¾″	2 pcs. 8′x10″x¾″
Chine Log	2 pcs. 27′x1¼″x3″	2 pcs. 22′x4″x1½″			2 pcs. 30′x1⅜″x2½″	2 pcs. 30′x1⅜″x2½″
Knees at Chine	48 pcs. 12′x6″x1″	38 pcs. of 12″x5″x1″				
Cabin Trunk Beams	16 pcs. 9′x1⅛″x1⅜″		7 pcs. 11′x2″x2¼″ 20 pcs. 12′x1⅜″x2¼″		12 pcs. 9′x1″x1¾″	20 pcs. 9′x1″x1¾″
Cabin Trunk Sides	2 pcs. 11′x10″x1½″ 1 pc. 5′ 6″x13″x1⅛″		2 pcs. 14′x24″x2″		12 pcs. 6′x1½″x2″ 26′x1′x1½″	19 pcs. 6′x1½″x2″ 38′x1″x1½″
Cabin Trunk Sill	16 pcs. 22″x3″x1″ 16 pcs. 14″x3″x1″		2 pcs. 14′x2″x3″		26′ of 1¼″x2″	38′ of 1¼″x2″
Cabin Trunk Sill	2 pcs. 12′x2″x1⅛″		2 pcs. 14′x3¾″x3″		100 sq. ft. of ½″	125 sq. ft. of ½″
Cabin Trunk Facing Pieces	60′ of ½″x3″ 30′ of ½″x5″		90′ of ⅜″x4″		2 pcs. 26′x3″x½″	30′ of 3″x½″
Cabin Trunk Top	100 sq. ft. of ¾″ T G & V		300 sq. ft. of ⅞″ T G & V		90 sq. ft. of ⅝″ T G & V	150 sq. ft. of ⅝″ T G & V
Cabin Trunk Half Round	40′ of 1″ Half Rd.		2 pcs. 18′ of 1″ Half Rd.		35′ of 1″ Half Rd.	48′ of 1″ Half Rd.
Cabin Trunk Corner Posts	4 pcs. 2′ 6″x2″x2″ 12′ pcs. 2′x5′x1″		2 pcs. 2′ 3″x2″x2″		2 pcs. 3′x6″x3″ 2 pcs. 3′x2″x2½″	2 pcs. 3′x6″x3″ 2 pcs. 3′x2″x2½″
Keel	23′x17″x5″	17′x13″x2½″	1 pc. 12′x10″x8″ 1 pc. 16′x18″x8″ 1 pc. 19′x21″x8″	22′x15″x3″	23′x3″x8″	29′x3″x8″
Stem	5′ 3″x6″x3″	5′x9″x2½″	1 pc. 7′x15″x8″	6′x11″x3″	1 pc. 4′ 6″x5″x3″ 1 pc.4′ 3″x12″x3″	1 pc. 4′ 6″x5″x3″ 1 pc. 4′ 3″x12″x3″
Stem Apron	3′ 6″x15″x3″	3′x14″x2½″	1 pc. 5′x14″x8″	4′x14″x3″	1 pc. 2′ 3″x12″x3″	1 pc. 2′ 3″x12″x3″
Shaft Log	3′ 6″x5″x7″	3′x5″x7″	1 pc. 4′x8″x12″	3′ 6″x5″x7″	2′ 4″x6″x6″	
Stern Post	1′ 9″x5″x5″	20″x5″x6″	1 pc. 3′x9″x8″	2′ 3″x5″x6″		
Transom Planking	35 sq. ft. of ⅞″	30 sq. ft. of ⅞″	40 sq. ft. of ⅞″		20 sq. ft. of 1′	20 sq. ft. of 1″
Transom Framing	30′ of 1″x3″	20′ of 1″x2″	25′ of 2″x3″		24′ of 1¼″x2½″ 1 Knee 15″x15″x2″	24′ of 1¼″x2½″ 1 Knee 15″x15″x2″
Horn Timber	3′ 6″x6″x5″	4′ 6″x9″x5″	7′x10″x8″	5′ 3″x12″x4″ 5′x15″x4″	2 pcs. 10′x4″x2½″ 1 pc. 6′x11″x5″	
Floor Timbers	16 pcs. 4′x7″x1″	12 pcs. 3′x9″x1¼″				

Transom Framing	30′ of 1″x3″	20′ of 1″x2″	25′ of 2″x3″		24′ of 1¼″x2½″ 1 Knee 15″x15″x2″	1 Knee 15″x15″x2″
Horn Timber	3′ 6″x6″x5″	4′ 6″x9″x5″	7′x10″x8″	5′ 3″x12″x4″ 5′x15″x4″	2 pcs. 10′x4″x2½″ 1 pc. 6′x11″x5″	
Floor Timbers	16 pcs. 4′x7″x1″	12 pcs. 3′x9″x1¼″	28 pcs. 4′x12″x2½″	17 pcs. 4′x9″x1¼″	6 pcs. 4′x6″x1⅛″	7 pcs. 4′x6″x1⅛″
Floor Timbers	4 pcs. 2′x12″x1″		4 pcs. 3′x18″x2½″	5 pcs. 3′x12″x1¼″		
Frames	96 pcs. 5′x1⅛″x2″	76 pcs. 4′x1½″x1⅛″	38 pcs. 22′x2″x2½″	33 pcs. 18′x1¼″x1¼″	40 pcs. 4′ 6″x4″x⅞″	40 pcs. 4′ 6″x4″x⅞″
Garboards	2 pcs. 25′x8″x⅞″	2 pcs. 20′x6″x⅞″	2 pcs. 40′x9″x1¼″	2 pcs. 32′x8″x⅞″	2 pcs. 30′x8″x⅞″	2 pcs. 30′x8″x⅞″
Sheerstrakes	2 pcs. 27′x6″x⅞″	2 pcs. 22′x6″x⅞″	2 pcs. 45′x9″x1¼″	2 pcs. 32′x8″x⅞″	2 pcs. 30′x8″x⅞″	2 pcs. 30′x8″x⅞″
Planking	350 sq. ft. of ⅞″	200 sq. ft. of ⅞″	950 sq. ft. of 1¼″	650 sq. ft. of ⅞″	450 sq. ft. of ⅞″	450 sq. ft. of ⅞″
Rail Cap		2 pcs. 9′ 6″x10″x1″	2 pcs. 32′x4½″x1¼″	2 pcs. 15′x1″x4¼″	25′ of 1½″x1″	16′ of 2″x1″
Bilge Stringers			4 pcs. 40′x2″x5″	4 pcs. 30′x1¼″x3″		
Main Deck Beams	7 pcs. 8′x1¼″x2″	1 pc. 6′x1½″x1½″	3 pcs. 12′x2½″x3¾″		1 pc. 9′x2″x2″	1 pc. 9′x2″x2″
Beams Alongside House	2 pcs. 12′x6″x1¼″		20 pcs. 13″x2⅛″x3″ 16 pcs. 10′x2⅛″x3″			
Other Deck Beams			6 pcs. 12′x2⅛″x3″		10 pcs. 9′x1⅛″x2″	7 pcs. 9′x1⅛″x2″
Deck Filler Blocks	3 pcs. 14″x14″x2″	3 pcs. 14″x14″x1½″	8 pcs. 20″x20″x2½″	4 pcs. 9″x9″x1½″	3 pcs. 14″x14″x1½″	3 pcs. 14″x14″x1½″
Deck Plank	42 sq. ft. of ⅞″	30 pcs. 8″x2″x1″	80 sq. ft. of 1¼″	8 sq. ft. of 1″	45 sq. ft. of 1″	40 sq. ft. of 1″
Plankaheer	2 pcs. 24′x6″x⅞″ 2 pcs. 5′x9″x⅞″	1 pc. 5′x5″x1″	4 pcs. 11′x9″x1⅛″ 3 pcs. 8′x9″x1¼″		2 pcs. 8′x10″x1″ 2 pcs. 13′x12″x1″ 2 pcs. 12′x8″x1″	2 pcs. 8′x10″x1″ 2 pcs. 13′x12″x1″ 2 pcs. 12′x8″x1″
Cockpit Seat Tops	15 sq. ft. of ⅞″	25 sq. ft. of ⅞″	20 sq. ft. of ⅞″	8 sq. ft. of ⅞″		
Cockpit Seat Framing	40 running ft. of 1½″x1½″	25′ of 1″x1¼″	50′ of 1½″x1½″	25′ of 1¼″x1¼″		
Cockpit Seat Backboard		8 sq. ft. of 1″		9 sq. ft. of 1⅛″	11 sq. ft. of 1⅛″	
Bulkheads	125 sq. ft. of ⅞″ T G & V	55 sq. ft. of ⅞″ T G & V	275 sq. ft. of ⅞″ T G & V	150 sq. ft. of ⅞″	110 sq. ft. of ½″ T G & V	90 sq. ft. of ½″ T G & V
Rudder	12 sq. ft. of 1½″	Metal	10 sq. ft. of 2¼″	Metal	7 sq. ft. of 1″	2 pcs. 36″x27″x1″
Mast	29′x6″x6″		1 pc. 32′ 6″x6″x6″ 1 pc. 37′ 6″x6″x6″	1 pc. 10′ 6″x4″x4″		
Mast Step	2′x4″x1¼″		2 pcs. 36″x4″x3″	1 pc. 9″x9″x1¾″		
Breasthook	1′ 6″x3′x1½″	18″x12″x1½″	24″x24″x2″	24″x12″x1½″	24″x12″x1½″	24″x12″x1½″
Quarter Knees	2 pcs. 9″x9″x1½″	2 pcs. 6″x6″x1½″	2 pcs. 18″x6″x2″	24″x12″x1½″	6″x6″x1½″	6″x6″x1½″
Cockpit Seat Fronts	15 sq. ft. of ½″ T G & V	15 sq. ft. of ⅝″ T G & V	20 sq. ft. of ⅜″ T G & V	9 sq. ft. of ⅜″ T G & V	11 sq. ft. of ⅜″ T G & V	6 sq. ft. of ⅜″ T G & V
Engine Bed Logs	2 pcs. 5′x14″x2½″	2 pcs. 6′x14″x3″	2 pcs. 8′x18″x4″	2 pcs. 8′x20″x3″	2 pcs. 9′x12″x3″	2 pcs. 6′x12″x3″
Engine Bed Floor Timbers	3 pcs. 4′x8″x2½″	5 pcs. 4′x8″x2½″	5 pcs. 4′x12″x4″	8 pcs. 4′x12″x3″	6 pcs. 4′x12″x3″	6 pcs. 4′x12″x3″
Sheer Ribband	2 pcs. 27′ of 2″ Half Rd.	2 pcs. 22′ of 2″ Half Rd.	2 pcs. 43′ of 2″ Half Rd.	2 pcs. 32′ of 2″ Half Rd.	2 pcs. 30′ of 2″ Half Rd.	2 pcs. 30′ of 2″ Half Rd.
Chock Rail	2 pcs. 6′x4″x1⅛″	2 pcs. 5′x4″x1⅛″		2 pcs. 7′x3″x1¼″	2 pcs. 5′x6″x1″	2 pcs. 5′x6″x1″
Keelson					19′x5″x1⅛″	28′x5″x1⅛″
Strut					1′ 9″x6″x6″	
Cockpit Floor	60 sq. ft. of 1″	50 sq. ft. of 1″	80 sq. ft. of 1¼″	80 sq. ft. of 1″	60 sq. ft. of 1″	60 sq. ft. of 1″
Cockpit Floor Beams	11 pcs. 9′ 6″x1⅛″x2″	15 pcs. 8′x1⅛″x1¾″	13 pcs. 10′x1⅜″x2¼″	15 pcs. 9′x1¼″x2″	13 pcs. 9′x1½″x2″	8 pcs. 9′x1½″x2″
Raised Deck		90 sq. ft. of ¾″ T G & V		140 sq. ft. of ¾″ T G & V		
Raised Deck Beams		13 pcs. 8′x1⅛″x1¾″		18 pcs. 9′x1¼″x2″		
Cockpit Ceiling		60 sq. ft. of ⅜″ T G & V	10 sq. ft. of ¾″ T G & V	75 sq. ft. of ⅜″ T G & V	16 sq. ft. of ⅜″ T G & V	4 sq. ft. of ⅜″ T G & V
Cabin Floor	45 sq. ft. of ¾″	20 sq. ft. of ¾″	125 sq. ft. of ⅞″	50 sq. ft. of ⅞″	45 sq. ft. of ¾″	115 sq. ft. of ¾″
Cabin Floor Beams			16 pcs. 7′x1⅜″x2¼″	2 pcs. 5′x1¼″x1¼″	5 pcs. 5′x1¼″x1½″	5 pcs. 6′x1¼″x1½″
Centerboard Trunk	17 sq. ft. of 1″ 25 sq. ft. of 1″ 5′ 6″x3½″x1″ 3′x6″x1½″ 2′ 8″x3¼″x1¼″	Skylight	2 pcs. 36″x12″x1¼″ 2 pcs. 24″x4″x1¼″ 1 pc. 24″x4″x2″ 4 pcs. 27″x3″x1½″ 4 pcs. 16″x3″x1½″	1 pc. 3′ 7″x3″x1½″ 2 pcs. 2′ 3″x6″x1½″ 2 pcs. 3′ 7″x4″x1½″ 2 pcs. 3′ 3″x4″x⅜″ 2 pcs. 24″x4″x⅜″ 22′x3½″x1″		

Yard and Shop

Notes of Interest to Both Owner and Manufacturer

Hall-Scott Eastern Branch Moves

The Eastern Sales & Service Branch of the Hall-Scott Motor Car Co., Inc., which is under the management of Arthur J. Utz, has moved to new quarters at 885-895 Niagara St., Buffalo, N. Y.

In the new quarters, Mr. Utz advises, this factory branch will be able to carry a larger stock of engines for quick shipment. A complete stock room is being equipped so that every part which goes to make up the current Hall-Scott models can be obtained quickly from this branch. Equipment is also being installed so that any parts needing repairs can be taken care of efficiently and quickly and also for the overhauling of engines by mechanics trained in the Hall-Scott factories.

This branch handles all correspondence and business for the company east of the Pacific Coast and Export business.

The Hall-Scott Motor Car Co., Inc., of Berkeley and San Francisco, Calif., is one of the largest manufacturing concerns west of the Mississippi and in addition to the building of Marine Engines, also manufacture other fine mechanical products.

An Explanation

In the January issue of MoToR BoatinG an illustration was used in the Correspondence Course of the U. S. Engineers motor launch Chicago. Our friend G. W. Schaeffer, an engineer in the Chicago office of the War Department has been caused much embarrassment by reason of the incorrect flying of flags on this boat at the time this picture was taken. Unfortunately before the boat was delivered to the government at the builders' trials it was found expedient to photograph the boat and in order to dress the boat up for this occasion some flags were found and used incorrectly. The War Department crew regularly manning this boat are well aware of the proper etiquette of flags and had no part in the dressing of the ship as shown in the picture. The use of this illustration while showing the incorrect flying of flags should not be considered a reflection on the crew of the boat and more particularly Mr. Schaeffer. He is one of the local authorities on matters of this kind and is one of the examiners who regularly each month corrects many of the papers received in MoToR BoatinG's Correspondence Course.

Congratulations

MoToR BoatinG adds its good wishes to those of many other friends congratulating Mr. and Mrs. Ralph Thompson on the occasion of their recent marriage at Springfield Gardens, Long Island, N. Y.

Large open runabout owned by H. C. Granneman, Brooklyn, N. Y. This 40-foot boat, powered with a model D-6 Scripps motor, delivers a speed of 21 m.p.h. This same owner uses a similar Scripps motor in another boat which is in service in Florida

New Sales Manager for Philbrin Corporation

Announcement is made that H. W. Sholl has been appointed Sales Manager of the Philbrin Corporation, manufacturers of ignition equipment in Philadelphia. Mr. Sholl was formerly associated with the Splitdorf Magneto Company in the capacities of Salesman, Export Sales Manager and finally Sales Manager. The Philbrin Corporation's ignition equipment will be distributed more widely than ever before and many new yacht engines will be supplied with this equipment.

New Tax Law Causes Confusion

Some confusion has resulted as to the interpretation of Section 1003 of the new revenue law governing the usage tax on small boats. Correspondence with the Treasury Department has resulted in decisions to the effect that two conditions are necessary before a boat is considered taxable. First that it be over 5 net tons and second over 32 feet in length. It might be said that all boats which previously paid a tax at the rate of $10.00 per year can be considered exempted under the provisions of the new revenue act. In other words it must be both over 32 feet in length and over 5 tons net to be taxable.

The tax on other boats not over 50 feet remains $1.00 for each foot; length over 50 feet and not over 100 feet $2.00 for each foot; length over 100 feet $4.00 for each foot.

Stern Joins Elto Organization

Jacob Stern, for several years Export Sales Manager of Briggs & Stratton Company of Milwaukee and who has done much toward making their motor wheels, flyers, and scooters universally popular, has become affiliated with the Elto Outboard Motor Company. The export business of the Elto Company has taken on such large proportions that it has been found necessary to add a man of Mr. Stern's qualifications to properly handle the foreign demand for the Elto Light Twin.

Bosch to Exhibit New Models at Show

The display which the American Bosch Magneto Corporation of Springfield, Mass., will make at the New York Motor Boat Show this year will contain some new magneto models, as well as standard magneto types adapted for use on marine engines. Of the new magnetos to be shown will be an instrument for a single cylinder engine, the magneto being provided with a lighting attachment which can be used in lighting a motor boat.

One of the new Bosch Battery Ignition Systems will also be shown in operation, and there will be exhibited the standard Bosch Starting and Lighting apparatus as used on motor boats using gasoline for fuel.

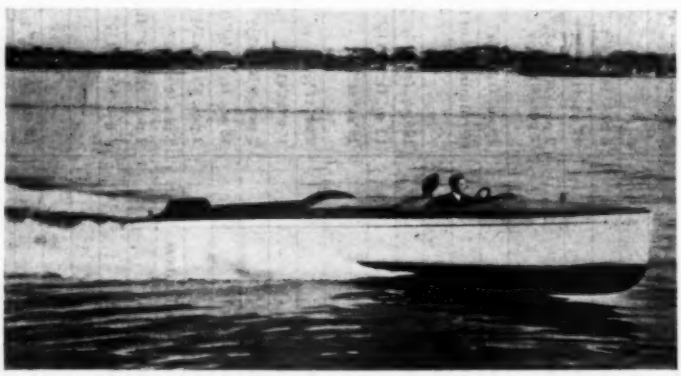
An interesting part of the exhibit will be the new models of Spark Plugs, the Bosch line now comprising 7 different types, which it is claimed enable them to fill the requirements of practically all types of motor cars, trucks, tractors, motorcycles, and motor boats.

Price Notice

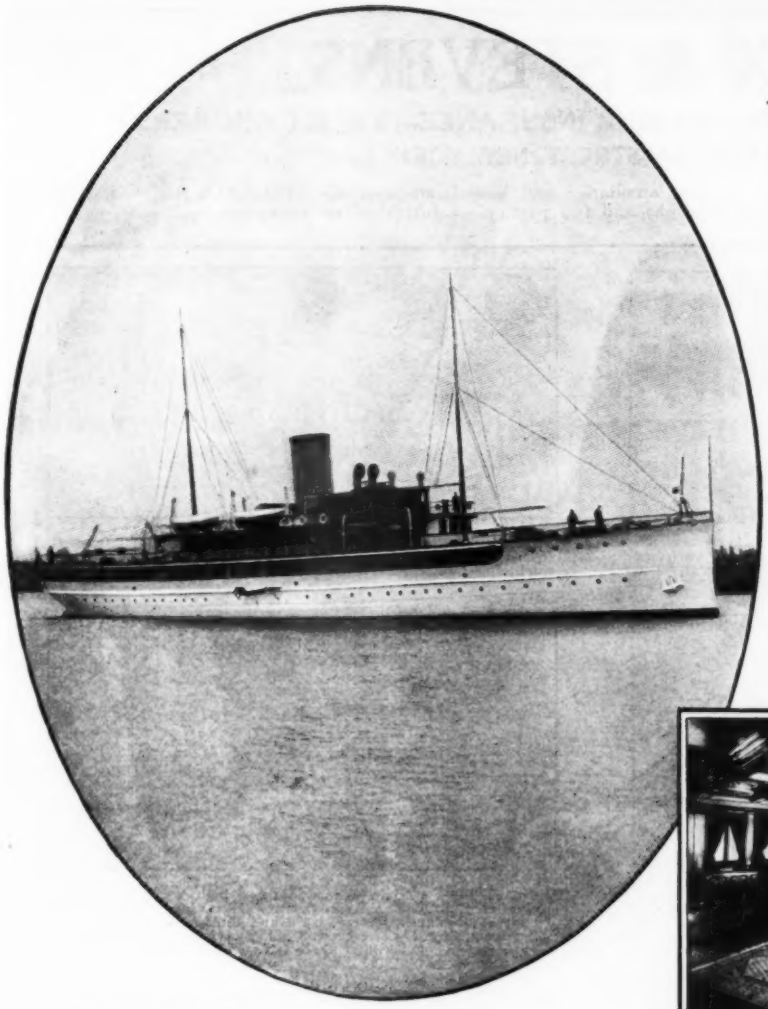
We are advised by the Delanco Ship Building Corporation that an error crept into the advertising copy used in some of the magazines other than MoToR BoatinG. In an effort to correct the false impression which may have been created they wish to announce that the price of their 27-foot standardized cruiser is to be $1,500 which is exclusive of the government tax. The error referred to mentioned that this price included the tax which is not the case.

The first of these boats has been completed and was examined a few weeks ago by MoToR BoatinG's staff. The impression made by this little boat upon the very critical visitors was most favorable and promises well for the season's business.

(*Continued on page* 64)



Miss New Bedford, a fast V-bottom runabout designed and built by Wm. H. Hand, Jr., of New Bedford, Mass., for his personal use. She is 26 feet long and equipped with a 125 h.p. Hall-Scott balanced four marine engine which gives her a speed in excess of 35 m.p.h.



Facts of interest about Delphine

Her principal measurements are: length over-all 257 feet 8 inches; length on load waterline 250 feet 6 inches; beam, 35 feet 5 inches and 15 feet 3 inches draft when fully loaded.

Electricity is employed for lighting, refrigerating, fresh and salt water service, ventilation, heating, etc.

Interior furnishings by Tiffany Studios, N. Y.

She is propelled by a pair of quadruple expansion engines and her installation of auxiliaries is in duplicate throughout.

Her equipment makes possible a 9000-mile cruise without seeking harbor.

Delphine—

"the last word in yacht design and construction"

Here is Delphine, by tonnage measurement the largest yacht ever built in America. Designed by Henry J. Gielow, Inc., of New York, for the late Horace E. Dodge, she was constructed by the Great Lakes Engineering Works, of River Rouge, Michigan.

In the Delphine all engineering details are carried out to mechanical perfection. Commodious staterooms, music room, and pipe organ, artistic draperies, lend all the charm and comfort of the finest home. In brief, to quote a recent marine article, "Delphine represents the last word in yacht design and construction."

And it is significant that on the specification of the designers, Delphine is *Valsparred, of course!*

This Coupon is worth 20 cents.

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The Varnish That Won't Turn White

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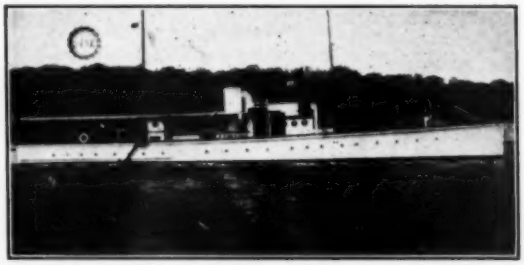
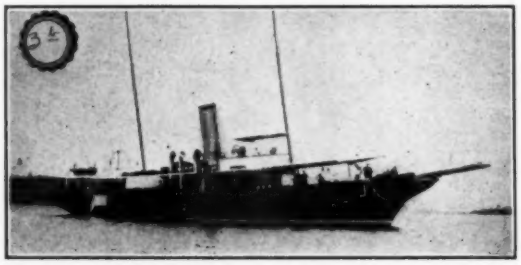
NAVAL ARCHITECTS—MARINE INSURANCE—YACHT BROKERS

15 WILLIAM STREET, NEW YORK

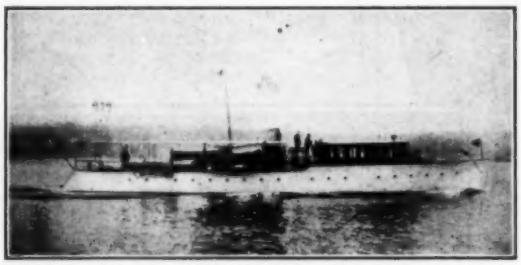
Complete list of all steam and power yachts, auxiliaries and houseboats available FOR SALE and CHARTER. A few are shown on this page. Plans, photographs and full particulars furnished on request.



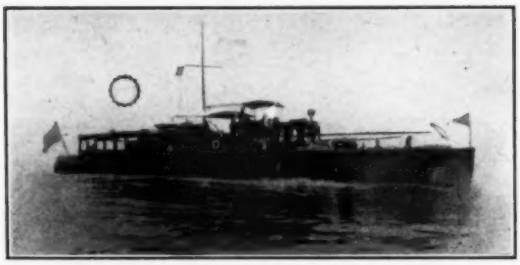
No. 2632—For Sale or Charter—Fast 128 ft. twin-screw cruising power yacht. Speed up to 22 miles. Dining saloon, five staterooms, two bath and toilet rooms. Exceptionally able craft. Cox & Stevens, 15 William Street, New York.



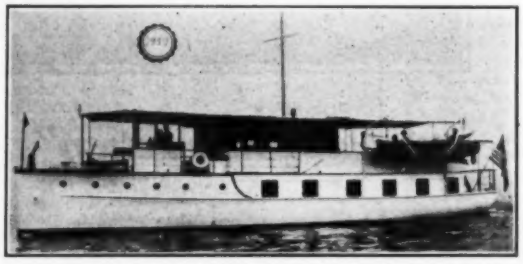
No. 3—For Sale or Charter—Bargain—Attractive 160 ft. steel steam yacht. Excellent accommodation; good speed. First class condition. Cox & Stevens, 15 William Street, New York.



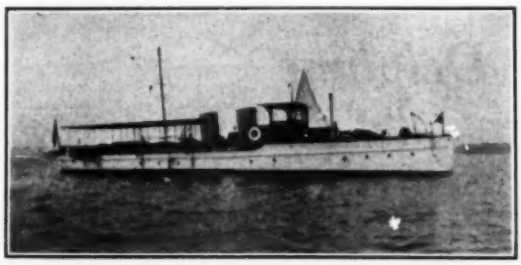
No. 979—For Sale (Might Charter):—Espepcially desirable 98 ft. twin-screw cruising power yacht. Speed up to 16 miles; Standard motors. Deck dining saloon, three double and one single staterooms, two bathrooms, etc. Teakwood deck house and deck trim. Completely overhauled, new furnishings throughout. Price low. Cox & Stevens, 15 William Street, New York.



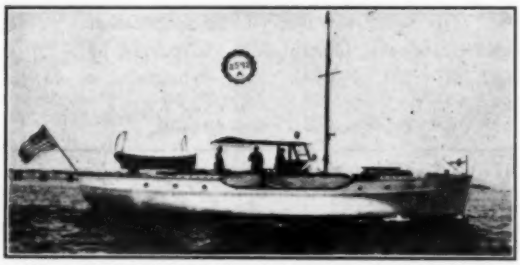
No. 3789—For Sale—Most desirable high speed twin-screw power yacht available. Approximately 88 ft. long. Speed up to 25 miles. Double stateroom, main and dining saloons, bath and toilet room, etc. Large cockpit. Mahogany hull. Price attractive. Cox & Stevens, 15 William Street, New York.



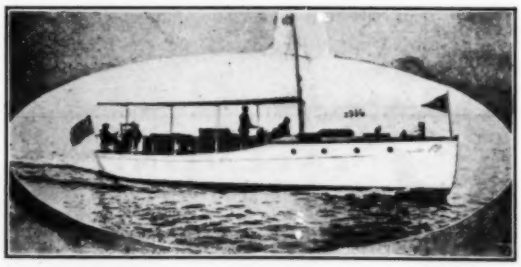
No. 3957—For Sale—Practically new 60 ft. Mathis houseboat. Standard motor. Dining saloon in deckhouse, main saloon, two double and two single staterooms, bathrocm and two toilets. Price attractive. Cox & Stevens, 15 William Street, New York.



No. 1997—For Sale—Cruising power yacht; 82 x 12 x 4 ft. Speed 12-14 miles; 6 cyl. 100-120 H.P. "20th Century" motor. Dining saloon, main saloon, one double and two single staterooms, toilet room, galley, etc. In good condition. Price attractive. Cox & Stevens, 15 William Street, New York.



No. 2592—For Sale—Bridge deck cruiser (double end type); 58 ft. 6 in. x 12 ft. x 3.10 ft. Built by Lawley in 1918. Speed up to 12 miles; 6 cyl. Murray & Tregurtha motor new 1921. Large saloon, two double staterooms, two toilet rooms, galley, etc. Delco lighting system. Handsomely finished and furnished. Further particulars from Cox & Stevens, 15 William Street, New York.



No. 2936—For Sale—Elco bridge deck cruiser; 45 x 10.7 x 3.6 ft. Speed 11 miles; 32-37 H.P. Standard motor. Double stateroom, saloon, toilet room, galley, etc. Good deck space. Price very reasonable. Cox & Stevens, 15 William Street, New York.

Advertising Index will be found on page 192

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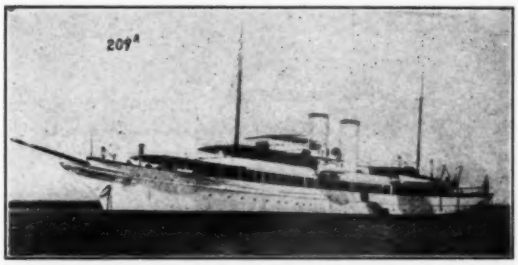
Telephones:
BROAD 1924
BROAD 1375

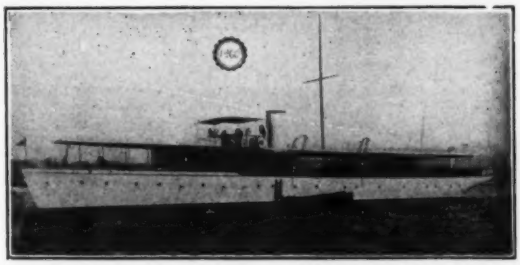
NAVAL ARCHITECTS—MARINE INSURANCE—YACHT BROKERS

15 WILLIAM STREET, NEW YORK

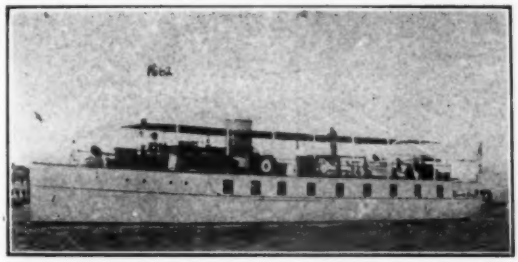
Complete list of all steam and power yachts, auxiliaries and houseboats available FOR SALE and CHARTER. A few are shown on this page. Plans, photographs and full particulars furnished on request.



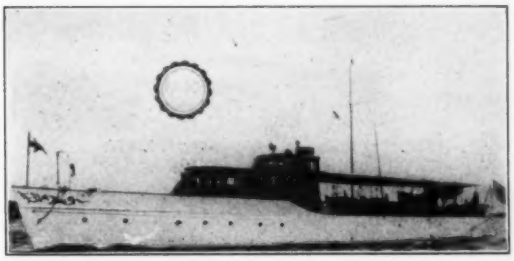
No. 209—For Sale or Charter—Large seagoing steam yacht. Exceptional speed. Roomy accommodation. Completely reconditioned recently. Unusual opportunity. Cox & Stevens, 15 William Street, New York.



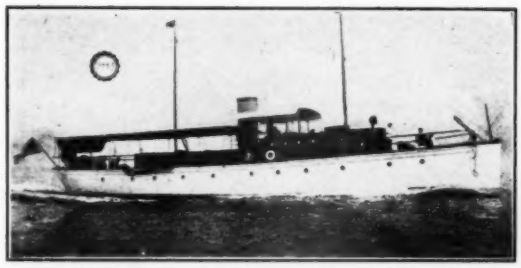
No. 1466—For Sale or Charter—Particularly desirable 140 ft. twin-screw steel cruising power yacht. Speed up to 18 miles. Dining saloon and social hall on deck; 3 double and 1 single staterooms, 3 bath and toilet rooms, etc. Recently overhauled thoroughly at large expense. Cox & Stevens, 15 William Street, New York.



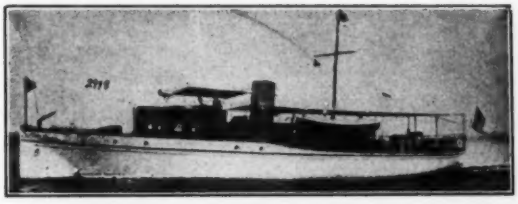
No. 1662—For Sale or Charter—Attractive 90 ft. twin-screw gasoline houseboat; speed 10-12 miles. Large saloon, four staterooms, two bathrooms; all conveniences. Handsomely furnished. Cox & Stevens, 15 William Street, New York.



No. 1230—For sale at low figure—Fast 104 ft. twin-screw cruising power yacht. Speed up to 18 miles; two 6 cyl. 200 H.P. "Speedway" motors. Deck dining saloon, main saloon, two double staterooms, shower bath and two toilet rooms, etc. New furnishings 1920. Further particulars from Cox & Stevens, 15 William Street, New York.



No. 3489—For Sale or Charter—Modern twin-screw power yacht, 90 x 16.3 x 5.2 ft. draught. Speed up to 15 miles; two 115 H.P. Winton motors. Dining saloon in deckhouse forward; two double and one single staterooms; bathroom and two toilets, galley, etc. Unusually large deck space. Price and further particulars from Cox & Stevens, 15 William St., New York.



No. 2978—For Sale—Desirable twin-screw cruising power yacht; 80 x 14 x 4 ft. Speed 13 miles; two 50-60 H.P. Twentieth Century motors new 1919. Dining saloon, two double staterooms, bathroom and two toilets, galley, etc. Recently thoroughly overhauled at large expense. Cox & Stevens, 15 William Street, New York.

No. 3151—For Sale or Charter—Particularly desirable twin-screw houseboat; 77 x 17.6 x 3 ft. Speed 11 miles; two 6 cyl. 60-70 H.P. Standard motors new 1919. Large deckhouse containing social hall; main saloon, two double and two single staterooms, two bath and toilet rooms, etc. Handsomely finished and furnished. Cox & Stevens, 15 William Street, New York.

No. 3477—For Sale—Fast bridge deck cruiser; 43 x 9 x 3.6 ft. Speed up to 17 miles; 130-150 H.P. 6 cyl. Speedway Motor. Saloon, double stateroom, two toilets, galley, etc. Splendid boat for ferry or day service. Price low. Cox & Stevens, 15 William Street, New York.

No. 4048—For Sale—Practically new, handsome, fast, twin screw cruiser; 64 x 12.6 x 3 ft. 6 in. draft. Speed up to 19 miles; two 8 cyl. 175 H.P. Van Blerck motors; electric starters. Enclosed bridge with full motor controls. Dining saloon, two double staterooms, toilet room, galley, etc. Probably roomiest boat of type and size available. Price attractive. Cox & Stevens, 15 William Street, New York.

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Cable Address:
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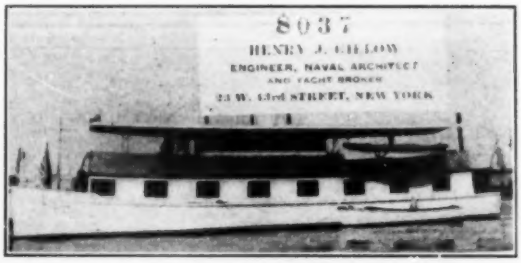
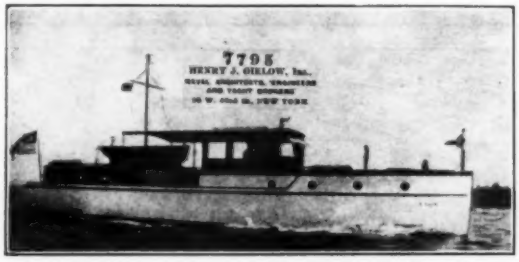
A.B.C. Code

Plans and specifications for new yachts of any size or type should be prepared now to assure delivery for next year. Have plans of new yachts, all types, on file now.

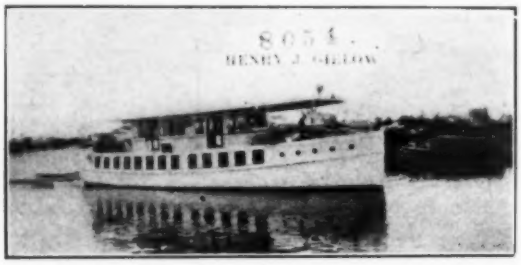
We have a most complete and up-to-date list of steam and motor yachts of all sizes, sail, auxiliary, and houseboats on file in our office, kept constantly up-to-date by a thorough and comprehensive canvass of the entire yachting field from time to time. We are in a position to submit full information on any type of boat upon request.



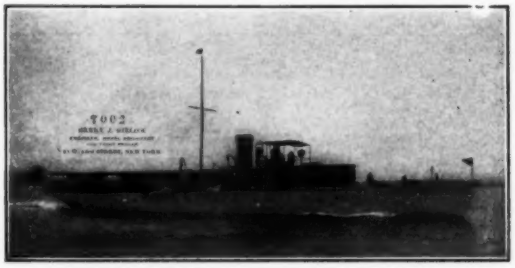
No. 8037—Now in Florida. Sale or Charter. 62 ft. cruising houseboat. One double and two single staterooms, bathroom. Large deck saloon, all conveniences. Henry J. Gielow, Inc., 25 West 43rd St., New York City.



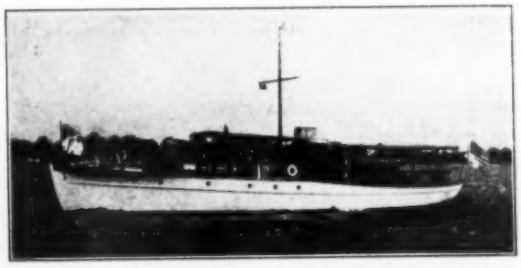
No. 7795—For Sale—45 ft. bridge deck cruiser. Built 1920. Speed 12-14 miles. 100 H.P. Van Blerck motor. One double stateroom, main saloon with 2 Pullman berths, toilet room, galley, etc. Price attractive. Henry J. Gielow, Inc., 25 W. 43rd Street, New York City.



No. 8054—Located in Florida—Sale or Charter—Desirable 66 ft. cruising houseboat. One double and four single staterooms, bathroom. Large deck house containing lounging room. 50 H.P. motor. Henry J. Gielow, Inc., 25 West 43rd St., New York City.

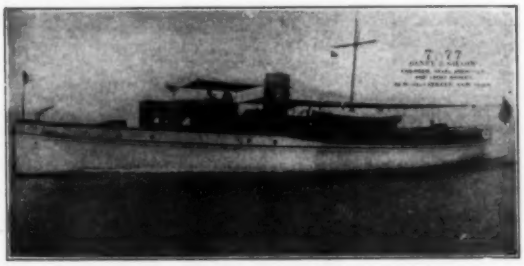


No. 7002—For Sale or Charter—Finest yacht of type available. 138 ft. twin-screw power yacht. Two 300 H.P. Standard engines. Dining room and social hall on deck; three double and one single staterooms; two bathrooms. All furnishings new 1920. Henry J. Gielow, Inc., 25 W. 43rd St., New York City.



No. 7080—For Sale—Desirable 80 ft. x 14 ft. x 4 ft. 6 in. twin screw power yacht. Speed 13-14 miles. Two double and single staterooms, bathroom, galley, etc. Heated by hot water. Hull and engines thoroughly overhauled 1921. All in first class condition. Inspectable Great Lakes. Henry J. Gielow, Inc., 25 W. 43rd Street, New York City.

No. 8050—For Sale or Charter—Located in Florida. Exceptional roomy 65 ft. cruising houseboat. Three double staterooms, bathroom. Large deck saloon. 50 H.P. motor, speed 10 miles. Henry J. Gielow, Inc., 25 West 43rd St., New York City.



No. 7077—For Sale—Particularly desirable 80-foot twin-screw power yacht. "20th Century" 50-60 H.P. motors, new 1919. Deck dining room, two double staterooms, bathroom. All furnishings and equipment new 1919. Excellent condition. Henry J. Gielow, Inc., 25 W. 43rd St., New York City.

No. 7376—For Sale—61 foot cruising power yacht. Speed 12 miles. 80 H.P. motor new 1920. Delco lighting plant new 1921. Double stateroom, two saloons. Sleeps six. All in first class condition. Henry J. Gielow, Inc., 25 W. 43rd Street, New York City.

Advertising Index will be found on page 192

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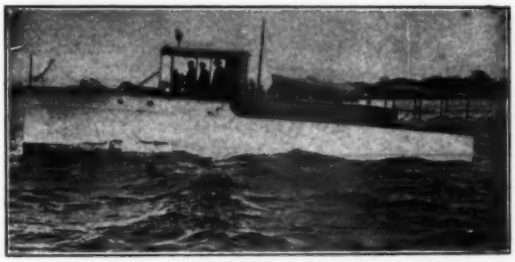
52 Pine Street New York City

Offer for sale the following yachts, some of which are available for charter

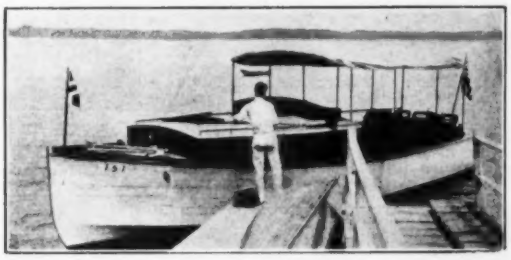
No. 1902—Sale or Charter—In Florida. Most commodious houseboat of her length available; 64 ft. x 17 ft. 6 in. x 3 ft. 2 in. draft.



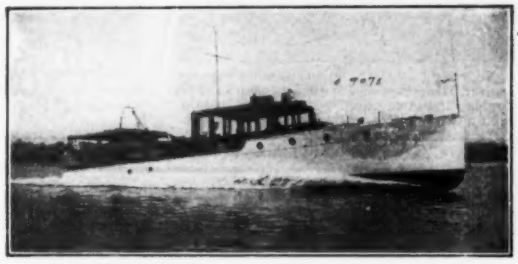
No. 7474—Sale—Brand new fast cruiser; 2-6 cylinder Sterling motors. Speed 21½ miles. All modern conveniences.

No. 8102—Sale—Charter—Most desirable raised deck cruiser available. Practically new. 81 ft. x 13 ft. x 5 ft. draft. Speed 15 miles. Electric light, hot water, heat and refrigerating plant.

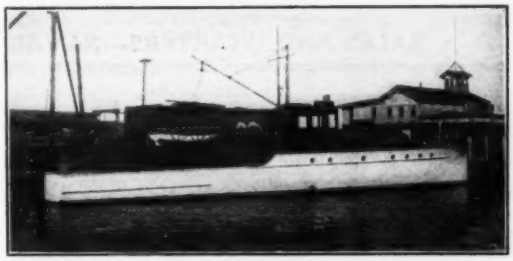
No. 8978—For Sale—Raised deck semi-day cruiser. 200 H.P. Sterling motor. Speed 20 miles per hour. In the very best of condition. Price reasonable. Full particulars and plans from Tams & King, 52 Pine Street, New York.



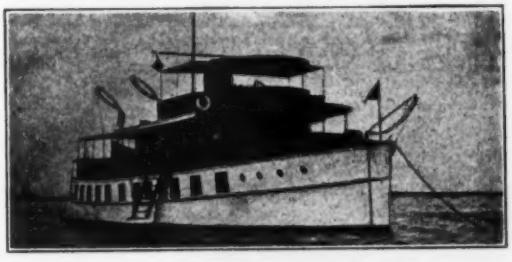
No. 9126—For Sale—Desirable day cruiser, built 1920. 4 cylinder 55 H.P. Sterling motor. Large cockpit.



No. 9078—Sale or Charter—Fast 48 ft. express cruiser in commission. Immediate delivery—2 new 6 cylinder Van Blerck motors. Good accommodations. Thoroughly overhauled last year in all departments.



No. 9075—For Sale—Desirable raised deck cruiser 70 ft. x 11 ft. x 4 ft. Good accommodations. Speed 23 miles.



No. 1926—Sale—Charter 98 ft. new houseboat; 6 staterooms, 3 bathrooms, dining saloon, sitting room; electric lighted and hot water heat.

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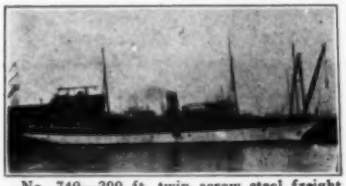
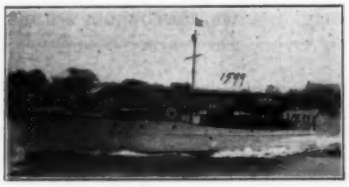


No. 740—200 ft. twin screw steel freight and passenger steamer. Oil fuel. Cargo capacity 350 tons. Cubic 60,000 ft. 16 staterooms on deck, each with upper and lower berth. Large dining saloon, wireless, large refrigerating plant and cold storage. etc. Classed A 1. Speed 14 knots. Price attractive.



No. 1599—50 ft. bridge deck cruiser. Two double staterooms, main cabin, toilet, etc. 50-85 H.P. Sterling motor installed 1921. Speed 11 miles.

No. 2136—Sale or Charter—Twin-screw 80 foot power yacht. Two double staterooms, dining saloon, etc. Two 220 H.P. Standard motors. Speed up to 21 miles.

No. 2014—70 ft. twin screw express cruiser. Designed and built by Luders. One double and two single staterooms. Main cabin. Two toilets, etc. Speed 20-25 miles.

No. 2034—52 ft. express cruiser. Double stateroom, main cabin. Two toilet rooms, etc. 200 H.P. motor. Speed up to 24 miles.

No. 2011—52 foot bridge deck cruiser. Double stateroom, main cabin, two toilet rooms. Two berths and toilet for crew. 130-150 H.P. Speedway Motor. Speed 15 miles.

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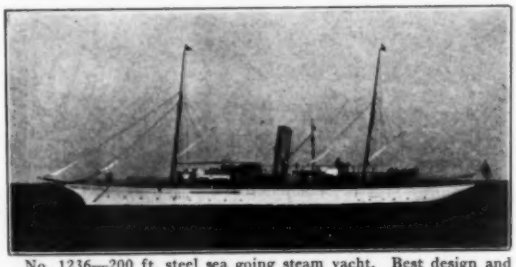
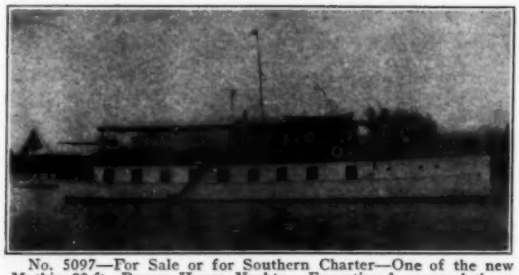
CUNARD BUILDING, 25 BROADWAY, NEW YORK

OFFICE NO. 1051

SALES AND CHARTERS—NAVAL ARCHITECTURE—MARINE INSURANCE



No. 1236—200 ft. steel sea going steam yacht. Best design and build. A-1 condition throughout. Oil burning. One of the finest vessels in the fleet. Frank Bowne Jones, Yacht Agent, 25 Broadway, New York.



No. 5097—For Sale or for Southern Charter—One of the new Mathis 80-ft. Power House Yachts. Exceptional accomodations. Frank Bowne Jones, Yacht Agent, 25 Broadway, New York.

No. 5343—62 ft. twin-screw express cruiser. Designed and built by Lawley. Best cabin arrangement. Frank Bowne Jones, Yacht Agent, 25 Broadway, New York.

No. 1986—88 ft. gas yacht. Twin screw. Good speed. Exceptional opportunity. Frank Bowne Jones, Yacht Agent, 25 Broadway, New York City.

No. 1175—56 ft. Elco Cruiser—2 double staterooms and saloon—good as new. Frank Bowne Jones, Yacht Agent, 25 Broadway, New York.

Advertising Index will be found on page 192

WILLIAM GARDNER & CO.

Naval Architects, Marine Engineers and Yacht Brokers

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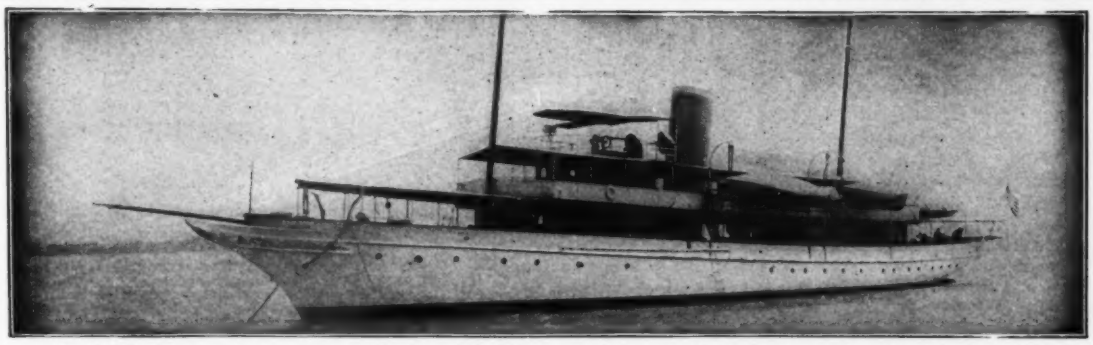
1 Broadway, New York

Cable Address Yachting, N. Y.

We have a complete list of Yachts of every description for sale and charter

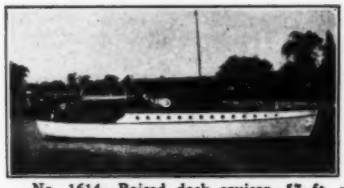
Plans, Photos and full particulars furnished on request.



No. 659—Steel steam yacht, deep sea type, 187 x 24 x 10 ft. Of best construction throughout, and of recent build from our designs. Promenade deck full width of boat. Has two large deck houses, with chart house and Captain's room on upper deck. Finely appointed owner's and guests' quarters. Was not used in Government Service. In best possible condition and should be seen to be fully appreciated. Inspection invited.

No. 2438—Handsome Express Cruiser, 87 x 12.2 ft.; mahogany planking; two 8 cylinder Speedway motors, speed 20-25 miles. Built under our supervision.

No. 2345—Patrol type. Twin-screw express cruiser, 60 x 10. Two 6 cylinder motors. Speed 25 knots. Very reasonable figure.



No. 1614—Raised deck cruiser, 57 ft. x 13 ft., Twentieth Century motor, 50 H.P. Three staterooms, saloon, etc. A1 condition.

Telephone Vanderbilt 10499

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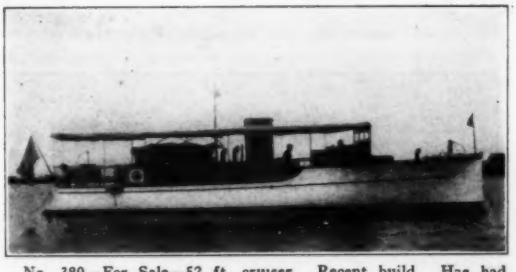
R. M. HADDOCK

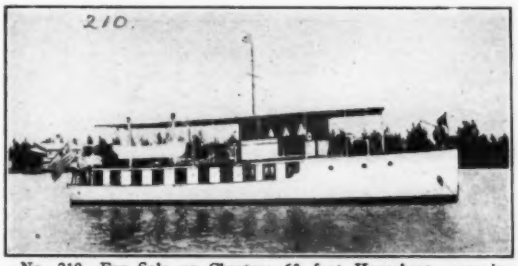
NAVAL ARCHITECT and YACHT BROKER

50 East 42nd Street, New York

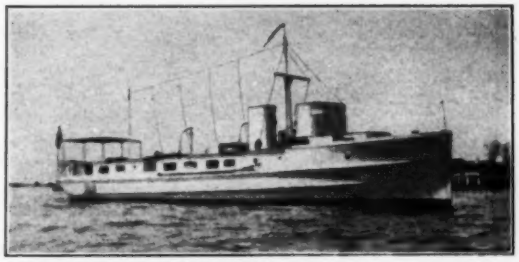
No. 426—For Sale—43 ft. Bridge Deck "V" Bottom Cruiser. Speed 17 miles. Has saloon and double stateroom, two toilets, galley, etc. 130-150 Speedway engine. Good boat for fast day service. R. M. Haddock, 50 East 42nd St., New York City.



No. 380—For Sale—52 ft. cruiser. Recent build. Has had almost no use since launching and has not been in the Government service. 150 H.P. Speedway engine. Will accommodate six. Apply R. M. Haddock, 50 East 42nd St., New York City.



No. 210—For Sale or Charter: 63 foot Houseboat, now in Florida Waters. 16 ft. beam, 3 ft. 6 in. draft. Two 50 H.P. 20th Century engines. One double and two single staterooms, bath, toilet, etc. Boat in fine condition. R. M. Haddock, 50 East 42nd St., New York City.



No. 316—For Sale: 59 foot Bridge Deck Cruiser, recent build. 70-90 H.P. Sterling engine 1917. A very able boat, economical to run. Price very reasonable. Apply R. M. Haddock, 50 East 42nd St., New York City.

TELEPHONE
STATE 6494

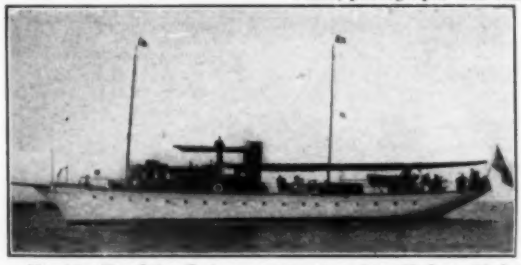
HENRY C. GREBE & CO., Inc.

6 N. MICHIGAN AVE.
CHICAGO, ILL.

YACHT BROKERS

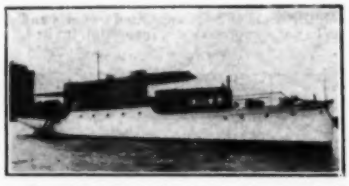
NAVAL ARCHITECTS. SURVEYING. MARINE INSURANCE.

We have a complete list of all steam and power yachts, auxiliaries, and houseboats, which are offered for sale and charter. Plans, photographs and full particulars furnished on request.

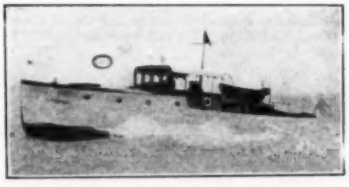


No. 36.—For Sale—Twin screw power yacht. 98 ft. x 16 ft. 6 in. x 4 ft. draft. Five staterooms, two baths. Deck dining saloon. Winton motors. In excellent condition. Henry C. Grebe & Co., Inc., 6 North Michigan Ave., Chicago, Ill.

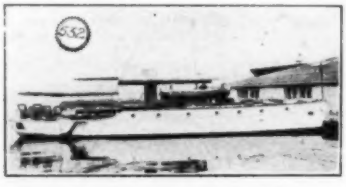
No. 941—For Sale or Charter—Attractive twin screw houseboat. 85 ft. x 19 ft. x 3 ft. 20th Century engine. Conveniently arranged. Large deck saloon. Five staterooms, three bathrooms. Handsomely furnished. Henry C. Grebe & Co., Inc., 6 North Michigan Ave., Chicago, Ill.



No. 38—For Sale—78 ft. Lawley built cruiser. Winton motor. Two commodious double staterooms. Two toilets. Dining saloon in deckhouse forward. A very able and modern boat. Henry C. Grebe & Co., Inc., 6 North Michigan Ave., Chicago, Ill.



No. 1018—For Sale—54 ft. twin screw express cruiser. Speed 20-25 miles per hour. Double stateroom and large main saloon. Two toilets and shower bath. Well equipped and in excellent condition. Henry C. Grebe & Co., Inc., 6 North Michigan Ave., Chicago, Ill.



No. 532 — For Sale — 71 ft. twin-screw flush deck motor yacht. Built by Seabury. Motors controlled from deck. Accommodations consist of one double stateroom, large main saloon, bath, etc. Attractive price. Located Great Lakes. Henry C. Grebe & Co., Inc., 6 North Michigan Ave., Chicago, Ill.

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Yacht Appraiser
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Should you desire to

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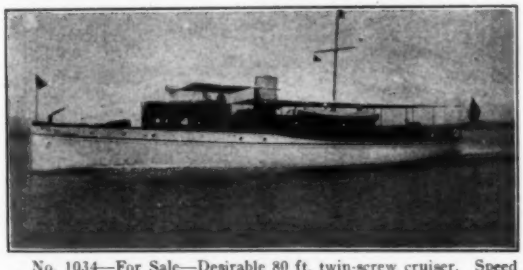
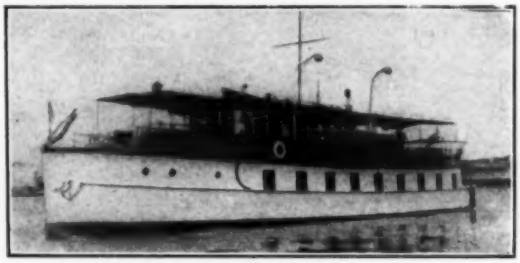
Communicate with this office. Personal attention, prompt service and a complete list of yachts of all types offered.

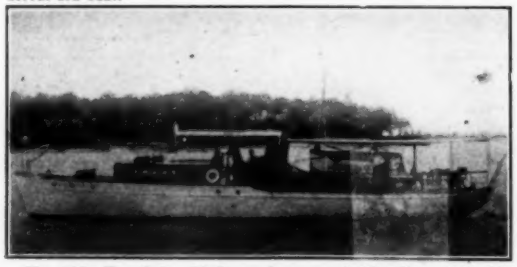
No. 979—52 ft. cruiser, speed 15 miles. Double stateroom and main cabin. Built 1918. Best of construction.



No. 1034—For Sale—Desirable 80 ft. twin-screw cruiser. Speed 14 miles. 2 double staterooms, dining saloon, bath, etc. A wonderful sea boat.

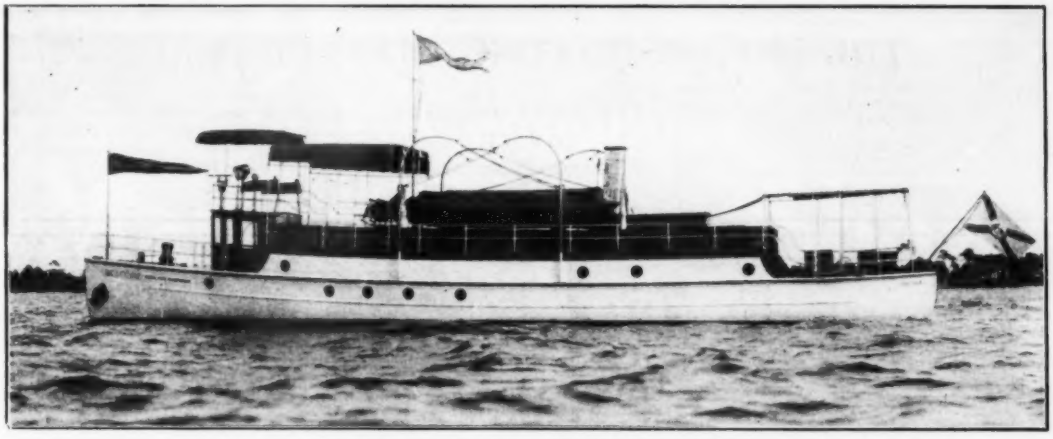


No. 1197—For Sale—Unusually fine 80 ft. twin-screw houseboat. 4 double staterooms and saloon, baths, etc. Recent construction. Speed 13 miles.



No. 189—For Sale—66 ft. cruiser, speed 12 miles. 2 double staterooms, bathroom, etc. Motor new 1920.

Advertising Index will be found on page 192



FOR SALE—THE HANDSOME YACHT "SEAFOAM"
Original Cost $38,000.00

Particularly attractive and desirable gasoline Yacht, length 65 ft., 9 in., width 14 ft., 4 in.; draft 30 in.; tonnage, gross 46, net 21; heavy sheet copper bottom well above water line; has two of the famous STANDARD engines, 32-37 H.P. each, 4 cylinder, 6 in. bore, 8 in. stroke twin screw; independent lighting plant with large searchlight of Carlisle & Finch make; speed 12 knots; large state room with French plate glass mirrors, private bath and toilet; 4 Pullman berths with blankets, bedding, etc., 6 wardrobes; large saloon with French plate mirrors, mahogany folding dining table with French plate mirror underneath; sideboard; china closet, with full equipment of linen, silver, dishes, etc., handsome carpets and rugs; two wicker sets consisting of settees, chairs and rockers on deck; refrigerator 600 pound capacity; well equipped galley, tanks; gasoline, 550 gallons; water, 600 gallons; cylinder oil 30 gallons; coal oil 30 gallons; power tender, life boat and life preservers; boat designed by C. A. Pearson and built by Pearson Construction Company of Duluth, Minnesota; engines built by Standard Motor Construction Company of Jersey City, N. J.; all railing and other metal of brass and copper; interior solid mahogany and quartered oak of beautiful design and finish; unobstructed passage in cabin from front to rear and on deck on either side; recently thoroughly overhauled and now in perfect order. A great yacht for either pleasure or passenger service, now ready for use. Probably the best buy and most desirable yacht available. SPECIAL BARGAIN for quick sale. Now at Pensacola, Florida. Address Owner,

WM. W. FLOURNOY, DeFuniak Springs, Florida

"OVER THE TOP" FOR SALE

A beautiful, all mahogany, runabout. Length 35 feet, Beam 6 feet 6 inches. 200 H.P., Hall-Scott six-cylinder marine engine. Speed 35 miles. Forward cockpit seats three. A very wholesome and seaworthy, fast, comfortable boat in first class condition. Can be inspected in Buffalo. Price $5500.00.

HUMPHREY BIRGE, 390 Niagara St., Buffalo, N. Y

Build a Boat

If you want to get the most downright fun out of your boating hours, plan to build your own boat with the help of MoToR BoatinG's newest "How to Build" book

Twenty Easy-to-Build Motor Boats

(Volume IV — Ideal Series) by William J. Deed and others

These are complete building plans and instructions covering many popular types of boats, designed especially for MoToR BoatinG by Wm. J. Deed and other popular motor boat designers.

Chum, a 16-foot Motor and Sail Craft
9-foot Easy-to-Build Dinghy
Nomad, a 34-foot Cruiser
9-foot Sharpie
Porpoise, a 20-foot Auxiliary Cat Boat
Kingfisher, a 14-foot Fishing Skiff
Shrimp, a 25-foot Hampton Boat
Flattie, a 16-foot Utility Boat
Dolphin a 34-foot Tunnel Stern Cruiser
9-foot Dory
8-foot V-Bottom Tender
Penguin, a 25-foot Auxiliary Sloop
Sea Gull, a 41-foot Auxiliary Schooner
Whale, a 20-foot Cruiser that's a Real Cruiser
Tarpon, a 29-foot Raised Deck Cruiser
Alligator, a 28-foot Tunnel Stern Cruiser
Mud Turtle, a 36-foot Stern Wheel Motor Boat
Rookie, a 20-foot Auxiliary Sloop
Nautilus, a 40-foot Tunnel Stern House Boat
Victory II, the Cruising Champion
Complete Bills of Material for Building

Printed in large type, on fine paper, and handsomely bound in cloth.

Price of Twenty Easy-to-Build Motor Boats.....$2.00

If ordered with other three books of Ideal Series, price of all four books..$6.00

Prices for all books of Practical Series, Ideal Series and V-Bottom Designs, Ten Books in all.

If Purchased Separately $17.00
All Books, 36 charts, log sheets and binder.

If ordered all at one time $12.00
Ordered together $16.00

Foreign Postage $1.50 extra. (See advertisement of charts and log book elsewhere in this issue)

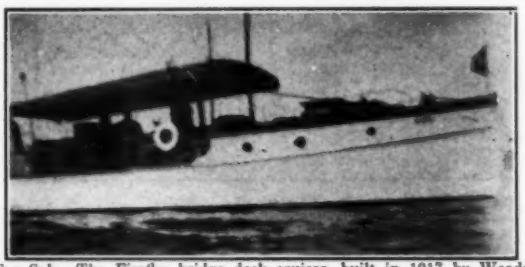
MOTOR BOATING, 119 West 40th St., New York

THE MOTOR BOATING MARKET PLACE

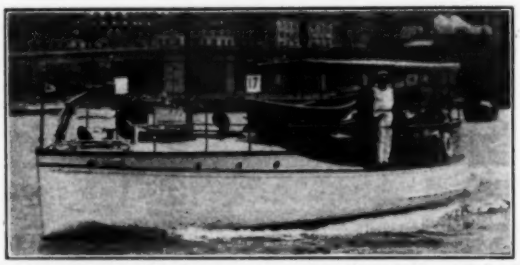
The rate for "For Sale" and "Want" advertisements is 6 cents per word, minimum $1.50. If an illustration is used, the charge is as follows, which includes the making of the cut:
Cut one inch deep, one column wide..... $ 5
Cut 1½ inches deep, 1½ column wide..... $10
Cut 2¼ inches deep, three columns wide..... $20
Terms: Cash with order.

Opportunities for the Motor Boatman

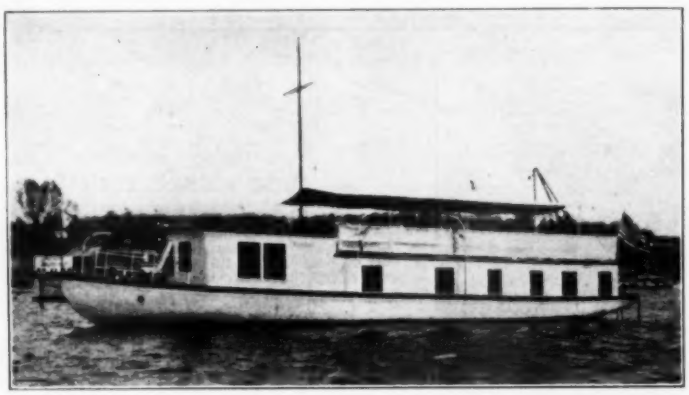
Before you buy or before you sell examine the exceptional buying and selling opportunities under this heading. They comprise the best offers of the month Please mention MoToR BoatinG.



For Sale—The Firefly, bridge deck cruiser, built in 1917 by Woods & Chute, of Greenport, L. I., 36 x 9, 6 x 3, 8, engine 4 cylinder, heavy duty, 46 H.P., Bosch equipped, speed 9 to 10 miles, sleeps five in three separate compartments, two toilets, two clothes presses, 6 foot 6 headroom throughout, electric lighting, boat is handsomely finished in every detail, is in absolutely perfect condition, battery and deck awning new in 1921, dinghy, searchlight, etc.; has cost as equipped $11,000, price $6,000. A. J. Patterson, 58 West 47th St., N. Y. C. Bryant 1681.



An opportunity is offered to secure an attractive 43 ft. x 10 ft. 4 in. cruiser at a very reasonable figure. Stateroom, saloon and ample accommodations. Completely furnished with all cruising equipment and powered with a four-cylinder model F M Sterling motor which is practically new. Speed 12 m.p.h. F. W. H., 63 W. 184th Street, New York, N. Y.



For Sale—Most commodious Florida boat: Houseboat "Roamer", 71 x 22 ft. (fully furnished). Salon 18 x 18 ft., bedroom 18 x 8 ft., 2 double staterooms 10 x 10 ft., 2 single staterooms, sleeping accommodations for 10 persons, galley 12 x 18 ft., 2 toilets, bathroom, fresh and salt water tanks, 2 20 H.P. Ralaco engines, twin screw, General Electric dynamo. Boat can be seen at Gage Shipyard, Nyack. Wm. J. Kennedy, 41 Park Row, N. Y.

FOR SALE OR CHARTER: Beautiful 60 ft. twin screw yacht, completely reappointed and overhauled. Solid mahogany trim thruout, two staterooms, with toilets, two motor dories, galley, two separate lounging decks, separate crew quarters. A splendid opportunity for a reasonable charter. For further information apply to Box 66, MoToR BoatinG.

A few pair of very powerful and clear Bausch & Lomb Prism Binoculars, 6 x 30 power, complete with case, etc. Worth $75.00, will take $40.00. Percy M. Child, 1110 14th St., N. W., Washington, D. C.

One 70 volt, 75 amp. direct connected Winton four cylinder generating plant, worth $1250.00, will take $500.00. One 110 volt, 39 amp. direct connected Winton four cylinder generating plant, worth $1250.00, will take $600.00. One 110 volt, 15 amp. direct connected one cylinder Carlisle & Finch generating plant, worth $350.00, will take $175.00. One 18 in. Rushmore search lamp, 35 amp., deck type, will take $125.00. One set large galv. running lamps, both oil and electric, suitable for vessel up to 100 ft., complete four lamps, $20.00. Let me quote you on marine search lamps, all sizes. Percy M. Child, 1110 14th St., N. W., Washington, D. C.

For Sale—Cabin cruiser, ocean going, 52 x 12 x 4, flush deck, heavy duty Standard engine, one man control, large cruising radius, sleeps eight, two cabins, attractively furnished. $3,500 American cash. A. E. Paradine, 104 Neville Pk. Blvd., Toronto, Canada.

TRIMOUNT WHISTLE BLOWER OUTFITS
Blower runs by friction contact with engine flywheel. Whistle of brass, nickel-plated.
Made in 3 sizes.

TRIMOUNT ROTARY HAND BILGE PUMPS
All bronze composition. Suction lift 6 to 20 feet. A lifelong convenience.
Made in 3 sizes.

TRIMOUNT ROTARY POWER CO.
20 Heath Street Boston, Mass.
(Factory: 292 Whiting Ave., E. Dedham, Mass.)

For Sale—60 H.P. 6 cyl. Lamb unit plant, $1200.00; 24 H.P. Waterman lightweight, $200.00; 12 H.P. Gray, $100.00; 23 x 28 3-blade R. H. Hyde propeller. Get our list. Jesiek Boat Company, Grand Rapids, Mich.

One cyl., two cycle

2HP	Detroit	$25.00
3HP	Truscott	30.00
4HP	Gray	55.00
6HP	Caille	65.00
8HP	Fairbanks	85.00

Two cyl., two cycle

6HP	Gray model U	95.00
8HP	Racine	65.00
11HP	Ferro	95.00
12HP	Straubel 3 cyl. heavy duty	135.00

Four cycle

4HP	Dunn 2 cyl.	$45.00
5HP	Universal 2 cyl.	40.00
6HP	Mack 2 cyl.	45.00
8HP	Dunn 2 cyl.	85.00
12HP	Doman 3 cyl.	125.00
12HP	Erd 4 cyl., latest model, new, 4 x 4	165.00
16HP	Dunn 4 cyl	145.00
20HP	Kermath Vanadium model 4 cyl., 4 cycle, magneto ignition	185.00
40-45HP	Buffalo 4 cyl. 7 x 9, heavy duty with reverse gear, 36 in. bronze wheel	950.00

BADGER MOTOR COMPANY
Milwaukee, Wis.

Advertising Index will be found on page 192

For Sale—Motor boat 16 x 4, cedar hull with top, 4 H.P. Fairbanks motor; seats upholstered. Outfit practically new, $200.00. 1-20 x 5 Runabout hull nearly new, complete, $200.00. 1-3 H.P. Sandow Marine motor with shaft, stuffing box and propeller, new, at $35.00. Colwell's Garage, Manawa, Wis.

NAVIGATION easily learned by mail or personal instruction. Fulfills examination requirements for mate's license. Fee moderate. Curriculum on request. Inquire Box 6, MoToR BoatinG.

Engineer wishes position, engineer or captain, long experience various types of marine engines, generators and storage batteries, expert on repair work. Box 171, Locust Valley, L. I., N. Y.

For Sale Cheap—6 cylinder type FM Sterling motor, complete lighting and starting, reverse gear, 5½ in. bore, 6¾ stroke. W. H. Kissam, 120 Broadway, New York City.

For Sale—46-ft. power cruiser, or will trade for its equal in a good sail-boat. B. H. Walker, Life Insurance Co. of Virginia, Richmond, Va.

Situation Wanted—Machinist—Life-long experience with Marine gas engines, exceptional knowledge of boats and engine installations, locates the engine troubles and knows the remedy. Advertiser is a man who knows his business and does it right. Desires position with a firm who appreciates a good man. Address Box 4, MoToR BoatinG.

Experienced Draftsman in New York City gives private evening instruction in yacht and ship drafting and design. Box 24, MoToR BoatinG.

For Sale—Two new type V5 Isotta 8-cylinder motors, 220 H.P., Dual ignition and carburetors, weight 750 lbs. each. Brady's Warehouse, 554 West 58th St., New York City.

Wanted—Auxiliary sloop or yawl 30 or 35 ft., modern boat, cruising accommodations four persons. E. C. Swan, 342 Capitol Ave., Hartford, Conn.

For Sale—One 6-cyl. 60 h.p. Lamb, built-in gear, fully equipped, bronze wheel. One 6 h.p. Stationary. Two 2-cyl., 2-cy. 6 h.p. Fairbanks. One 1-cyl., 2-cy. 6 h.p. Gray. One 1-cyl., 2-cy. 2½ h.p. Perfection. One 1-cyl., 2-cy. 2½ h.p. T. & M. Motor. One 2-cyl., 4-cy. 18 h.p., Beaver opposed gears. Rev. wheels, also other equipment. Let us know what you need. All bargains. Jesiek Bros., Macatawa, Mich.

A Continuous
Marine Engine Show
You Are Invited

Admission Free

to attend a continuous exhibition of new and rebuilt marine engines now on display at our showrooms

153-155-157-159 West 15th Street
New York City

Your favorite motor is in our stock of

GUARANTEED REBUILT ENGINES

Whether it be Sterling, Kermath, Standard, Frisbie, Van Blerck or almost any other make being manufactured, we have the machine you want at prices representing substantial savings on the prices of new machines.

These machines have been honestly overhauled in our own shops and are

GUARANTEED

Visit our showrooms, the largest of its kind in the world. It can be made the most interesting feature of your trip.

During the Motor Boat Show, we will offer special inducements in price and service and will hold any motor purchased, for spring delivery, if desired.

BRUNS, KIMBALL & COMPANY

153-155-157-159 West 15th Street New York City

We are Sales Distributors for and carry a stock of the following NEW machines:

Sterling	Kermath	Arrow	Wolverine	Regal
Frisbie	Peerless	Murray & Tregurtha	Doman	Missouri

THE MOTOR BOATING MARKET PLACE

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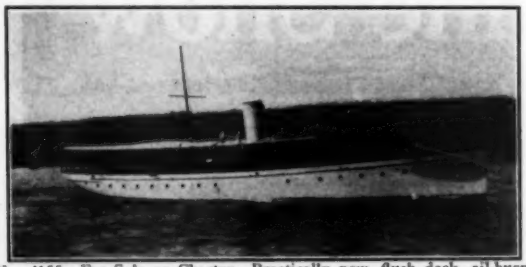
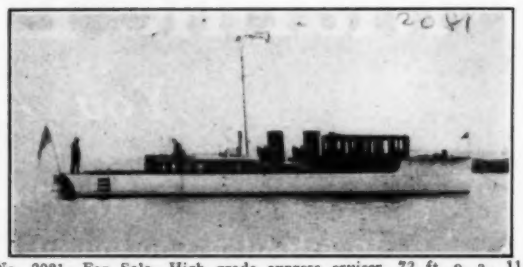


No. 4155—For Sale or Charter—Practically new, flush deck, oil-burning steam yacht; 100 x 18 x 6 ft. Extremely able; construction very heavy and of highest class. Speed 11-12 miles; triple expansion engine. Accommodations include deck dining saloon, two double staterooms, bathroom, two toilets aft. Handsomely finished and furnished. Very economical to operate. For further particulars apply to Cox & Stevens, 15 William Street, New York.



No. 2081—For Sale—High grade express cruiser, 72 ft. o. a., 11 ft. 9 in. beam, 3 ft. draft, designed by Bower & Mower. Double planked mahogany. Two 300 H.P., 6 cyl. Murray & Tregurtha engines installed 1920, now in perfect running order and good for ten years to come. Cruising speed 20 knots at 950 r.p.m. Deck saloon, double stateroom forward, main cabin and galley aft; two toilets. Exceptionally fine boat of this type. Apply John G. Alden, 148 State St., Boston.

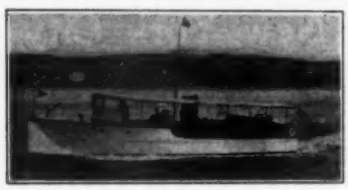
No. 2076—For Sale—Exceptional opportunity to procure almost new (July, 1921) bridge deck cruiser at a great reduction from the original cost. 41 ft. x 9 ft. 7 in. x 3 ft. Cruising speed 11 miles. Double stateroom, 4 berths in main cabin, galley, toilet, engine room under very roomy bridge deck, one berth for paid hand. Fully equipped; in best of condition. Apply John G. Alden. 148 State St., Boston.

For Sale—Sloop Miracle, 26 ft. x 7 ft. O. A. Keel type, oak frames, cypress planking, assembled with brass screws. Full equipment. First class condition. Photographs and details on request. Price $500. C. A. Spear, 101 Electric Ave., Rochester, N. Y.

Wanted—A 4 or 6 cylinder 4 cycle engine; high speed type of 40 to 60 H.P. unit power plant preferred. Nothing older than a 1921 model will be considered. Write name of motor, weight, equipment, condition and price to Taylor's Boat Livery, Blodgett Landing, N. H.

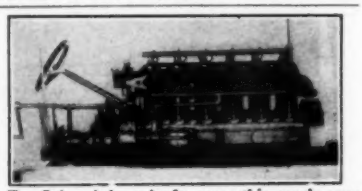
Wanted—Second hand speed motor for speed boat, 50 to 75 H.P.; give description, H.P., R.P.M. and weight. E. A. Meyers, Edgerton, Wis.

For Sale—Machine shop, brass foundry and real estate. Business now manufacturing well established marine accessories. Founded 1910. Price very reasonable. Box 10, MoToR BoatinG.



No. 1019—For Sale—60 ft. twin screw express cruiser. Excellent seaboat. Speed up to 26 miles per hour. Accommodations excellent. Price reasonable. Henry C. Grebe & Co., Inc., 6 North Michigan Ave., Chicago, Ill.

For Sale—Rochester Cruiser type 40 footer Full headroom throughout, 35 h.p. engine, speed 8 miles. Layout—forward stateroom two berths, toilet, marble w.b. Large galley with full outfit of cooking utensils and dishes, sink, running water. Engine room with 100 gal. tanks, generator, two berths. Engine starts with push button. 2 storage batteries. Main cabin sleeps four, closets and drawers, cushions, quilts, pillows. Large storage space under after deck. Deck house used for dining room, table, chart box with 100 charts laid flat, steering and controls from this house, fully enclosed and screened, double exit to each deck and to galley and engine room. Compass and all instruments. Forward deck with plenty of working room. All cables wind on drums in cable box. After deck with large leather seat with tank under 60 gal. Cabin top has cushions all around. Awning covers entire deck space. Boat sheathed for south water and ice protection. Electric lighted throughout. Ready to run in five days. Everything guaranteed. Cost $7000. Sell for less than half. Write C. S. Sickler, 6037 Chestnut St., Philadelphia, Pa.



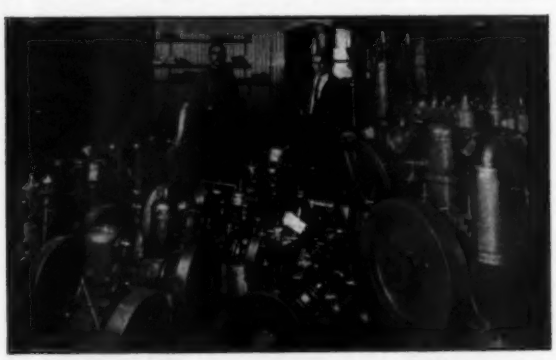
For Sale—A bargain for your this year's power plant, 6 cylinder Jencick engine, 5 in. bore, used only two seasons. Make offer. Box 19, MoToR BoatinG.

FREE Illustrated Literatures. Outboards, New and Rebuilt Engines. Universal Joints, Pumps, Clutches, Gears, Hyde's, Gordon Reversible Propellers, etc. Canadian Boat & Engine Exchange, Toronto.

Engine bargains in Sterling, Doman, Kermath, Erd and others; also rebuilt second hand motor and sail boats. Send for list. Everett Hunter Boat Co., Dept. E, McHenry, Ill.

For Sale—Scripps D-6 motor. 6 cylinder 60-75 H.P. Used ten days running generator during coal shortage. Price $1300.00 F.O.B. Detroit. Ockford Printing Co., 608 Howard St., Detroit, Mich.

Advertiser living in Montreal seeks capital and representation in United States for completing and marketing new method of controlling either motor, reverse, steering, engine room telegraph or semaphore. No wires, levers or cranks to break, wear or rattle. Absolutely miscometric in action, bends, angles or twists making no difference. Box 26, MoToR BoatinG.



All Sizes Rebuilt Marine engines from one to 300 H.P. 4 cyl. 4 cycle GLOBE 10 x 14", reverse gear, magneto, 40" propeller, $6,000.00. Pair STANDARD 300 H.P. 12 x 14" reversible, cost $25,000.00 each, price $4,000 each. Many other large and small four cycle and two cycle engines, for work boats, yacht, cruiser or tender. Write for list.

Hamilton Marine Engine Exchange 440 Fifty-Second St. Brooklyn, New York

WANTED ENGINES

Two 90 to 100 H.P.

At 800 to 1100 Revolutions

USED ENGINES

Factory Over-hauled. Tested and Guaranteed to drive 75 to 85 ft. yacht.

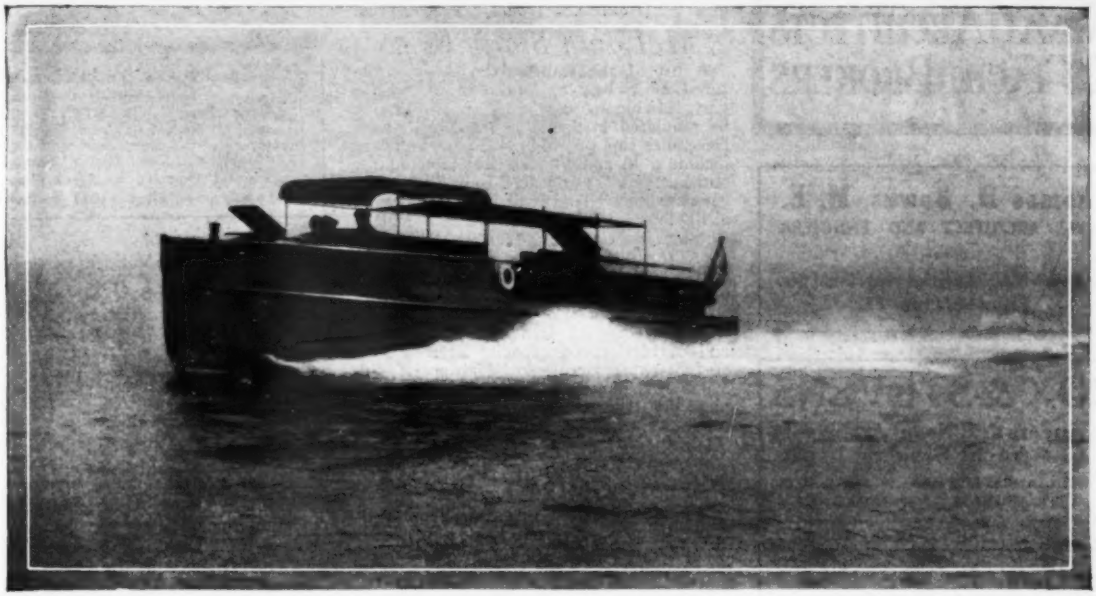
Will consider gasoline and oil engines.

Send full particulars, price, time used, etc.

MUST BE A BARGAIN. WILL PAY CASH.

FRANK B. STEARNS
918 Hanna Bldg.
Cleveland, Ohio.

Advertising Index will be found on page 192



P D Q, owned by Richard T. Davis, Chicago. Powered with GR (4) Sterling. Sold by W. L. Masters & Co., largest dealers of high grade engines in Central West. Hull designed and built by Peter Kargard

When Mr. Davis decided to have P D Q built he naturally came to W. L. Masters & Co. to select his power plant. After looking over our complete line of various sizes and makes he decided upon a Sterl ing for his particular needs

The Largest Dealers in NEW and REBUILT MARINE ENGINES in the Central West

EXPERIENCED engine buyers know that the stability and reputation of the dealer from whom they buy their engines is just as important as the reputation of the engine itself. This is particularly true in Rebuilt Engines.

Unless we tell you to the contrary, every used engine we sell is taken down, rebuilt and refinished like new in our own shops. Worn parts are replaced and every adjustment is in perfect running condition before we offer it for sale. We guarantee these engines to give absolutely as good service as brand new engines of the same make and power. Look these over:

30-45 H.P. Sterling, 4 cylinder, 4 cycle, 5½ x 6" in excellent condition, reverse gear built in and enclosed, Bosch magneto ignition, force feed lubrication system, a great bargain.

35-50 H.P. 6 Cylinder 4 x 4¾" Engine. Stromberg carburetor, Bosch magneto, coupling, water pump, oil pump, spark plugs, etc.

30 H.P. Doman, 4 cylinder, 4 cycle, 6 x 6", equipped with Bosch magneto and also distributor ignition, reverse gear, force feed oiler, a heavy duty motor good for years and years of service.

22 H.P. 4 Cylinder, 4 cycle Scripps unit power plant with Paragon reverse gear, force feed oiler, water pump, Bosch magneto, a medium duty type motor of excellent construction.

16 H.P. 4 Cylinder, 4 cycle Kermath unit power plant, complete wth reverse gear built in and enclosed, Bosch magneto, etc. in A1 shape.

14 H.P. Gray model T, 2 cyl. motor with two carburetors, water pump, reverse gear, thoroughly rebuilt and refinished, really the best model motor the Gray Company ever produced.

12 H.P. Gray Single Cylinder, thoroughly rebuilt and refinished, complete with reverse gear, a very good heavy duty motor.

8-10 H.P. Two Cylinder, Sterling, 4¾ x 6", complete with mechanical oiling system, reverse gear all enclosed. A medium duty power plant of the very best construction possible; specially priced.

8 H.P. Ferro, 2 cylinder, 2 cycle with reverse gear, fully equipped and overhauled. A smooth running motor and one that has always enjoyed an excellent reputation; a big bargain.

4½ H.P. model R Gray motor. One of the best the Gray Company have yet produced, an ideal motor for a small boat of 20' length and guaranteed.

2 H.P. One Cylinder Regal, used three days only, equipped with Bosch magneto ignition, water pump, reverse gear, couplings, a complete unit and an ideal installation for a small boat, guaranteed and offered at a big reduction. Special price.

If you don't see the size or make of engine you want in the above list, write us. Our lists of rebuilt engines change almost daily. Write or wire us today for prices.

We also carry in stock new motors of the prominent makes shown below. Our service facilities and stock of parts is one of the important reasons why you should select your power plant from our stock.

AUTHORIZED DISTRIBUTORS FOR:

Kermath, Sterling, Scripps,
Universal, Stearns,
Joes Gears, Evinrude, Hyde Propellers

W. L. MASTERS & CO. 231 North State Street, Chicago, Illinois

NAVAL ARCHITECTS & YACHT BROKERS

Thomas D. Bowes, M. E.
NAVAL ARCHITECT AND ENGINEER
Offices
Lafayette Bldg., Chestnut and Fifth Sts.
PHILADELPHIA, PA.

COX & STEVENS
Engineers and Naval Architects
Yacht Brokers
15 WILLIAM STREET, NEW YORK CITY
TELEPHONE 1375 BROAD

B. T. DOBSON
Naval Architect Yacht Broker
(P. O. Box 407) New Bedford, Mass.
Designer of Sailing Craft, Auxiliaries and Motor Boats. Specialist in V-Bottom Type.

William H. Hand, Jr.
NAVAL ARCHITECT
NEW BEDFORD, MASS.
HAND-V-BOTTOM DESIGNS
Send stamp for catalog illustrating forty-three typical Hand-V-Bottom designs.

R. M. HADDOCK
NAVAL ARCHITECT
Sail or Power Yachts, Houseboats and Commercial Vessels
Yacht Broker Sales and Chartering
50 East 42nd St. New York City

FREDERICK K. LORD
NAVAL ARCHITECT
120 BROADWAY NEW YORK

CHARLES D. MOWER
Designer of
SENSIBLE CRUISERS
POWER—SAIL—AUXILIARY
Twenty-five years' practical experience
350 Madison Avenue New York City

FREDERIC S. NOCK
NAVAL ARCHITECT
Yacht Builder, Marine Railways, Storage and Repairs
East Greenwich, Rhode Island, U. S. A.

Yard and Shop

(*Continued from page* 50)

McLouth Stock Boats

A list of the standard boats manufactured by Sidney C. McLouth of Marine City, Michigan, was received too late to be tabulated in the table published in the December isue of MoToR BoatinG. These include a 16 and 18-foot boat adapted for outboard motors and a 25-foot six passenger runabout. This is to be powered with a 4-cylinder Hall-Scott motor and will be suitable for competition in the Gold Cup race. Another special runabout designed particularly for the Gold Cup class will be powered with a 525-cubic inch motor with a speed of from 35 to 45 m.p.h. A 36-foot runabout equipped with a powerful motor and of high speed capacity as well as a 46-foot express cruiser of high speed with 500 to 900 h.p. are included in their complete line.

Richards to Build Small Boats

Announcement has just come from William Richards of New York that he is planning to build full sized tenders. Better known for his small sail boat models which are to be retained as a separate department, the main work of the shops in the future will be the building of 9-foot dinghies, 12-foot tenders, and 16-foot outboard motor boats of the highest class of construction.

The 9-footer is canvas covered over planked and battened construction to weather on deck or davits; the 12-footer is the typical tender for owners' or general boat to shore ferrying, designed especially for the outboard motor; the 16-foot boat is his first motor boat or the family's pride for that matter, being sane, safe, and very sound.

Wm. Richards who in former years designed and built from row boats to 60-foot motor yachts is well equipped with the knowledge and skill, in fact, Richards' Boats are guaranteed in every way.

Appoints Warehouse Distributor in Northwest

"A live distributor for a live product" is an axiom as old as the hills and this, no doubt, accounts for the appointment of the Paragon Tool Company of Seattle as warehouse distributor for Deluxe Light Weight Gray Iron Pistons, covering the Pacific Northwest.

This concern is well established in the Northwest, and carries one of the most complete stocks of motor parts and accessories in the country. They have a branch at Portland and expect also to establish a branch at Spokane.

This warehouse stock of Deluxe pistons will run in the neighborhood of 25,000 and will be a part of the chain of warehouses placed in various sections of the country, guaranteeing service to all dealers and repair men of twenty-four hours or less.

On a recent visit to Los Angeles, where arrangements for warehouse stock were completed, Mr. Brown, the President of the Paragon Tool Company, said: "It is our intention to spare no effort in building up a service on Deluxe pistons in the Pacific Northwest, second-to-none in the country. It is also our intention to place a stock with every cylinder grinder, dealer and repair man, so that the motorist can get the piston he wants when he wants it."

The standing of this concern, together with their reputation for service, promises extremely well for the future of Deluxe pistons in the Northwest.

Advertising Index will be found on page 192

RALPH E. WINSLOW
Naval Architect
River Street, ATLANTIC, MASS.
Designer of high grade wood and steel, Steam, Motor, Auxiliary and Sailing Yachts and Commercial Vessels.
18 years' experience. Stock plans.
Phone Granite, Mass., 1011 or 2599-M

Buffalo Prices Reduced

The Buffalo Gasolene Motor Co., Buffalo, N. Y., manufacturers of Buffalo marine engines, has just issued a new price list in which some material changes are made from the prices of 1921.

On the average the company estimates that the prices of Buffalo engines, as shown by the new price list, have been reduced more than 25 percent. This does not mean that it is a blanket 25 percent reduction. As a matter of fact in the case of one Buffalo motor the price has been raised a few dollars, but this is the exception and, as a general rule, the new prices will show a decrease of around 25 percent or better.

This is not the first cut in Buffalo prices. New price lists have been issued several times within the last two years and each time the buyer of engines has been given the advantage of whatever saving was possible as a result of improved manufacturing facilities and the lower cost of labor and material.

In a table just prepared by the Buffalo Gasolene Motor Co. the new prices are contrasted with the prices of 1920 and 1921 and the difference certainly proves that the price of Buffalo engines has descended in considerably more than a nominal way.

Take the 125-150 H.P. Buffalo Heavy Duty engine as an example. Comparing the 1920 price of this engine with the present price shows that this particular model is selling at a reduction of $2,550, the old price being $11,400 and the new price $8,850. This engine is, of course, a machine of tremendous size and it is selected as an example for the reason that the difference mounts into large figures, but the same reduction of price has been applied to most of the other motors commonly bought by motor boat users.

The 25-30 H.P. Cruiser & Runabout engine is one of the most popular models. In 1920 this engine sold for $1,400, in 1921 the price was reduced to $1,260 and in the new price list just published it is listed at $1,000 even money.

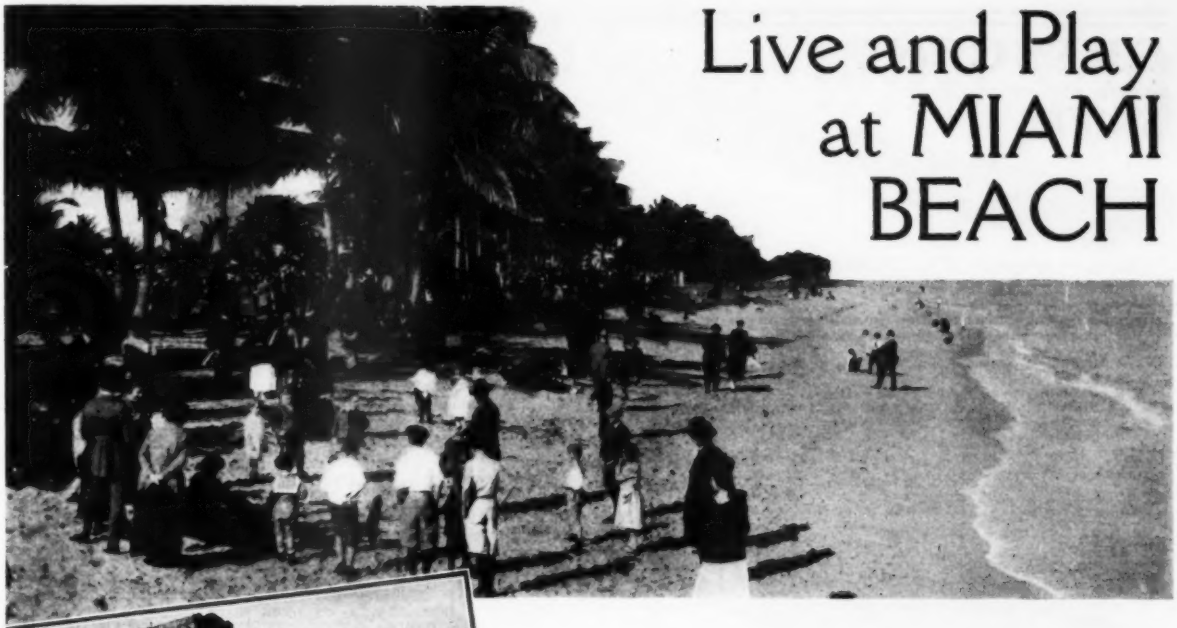
A more spectacular saving is shown in the case of the 40-60 H.P. Cruiser & Runabout engine. This motor which in 1920 sold for $2,625 and in 1921 at $2,363 is now listed at $1,600, a reduction of $1,025 over the 1920 price and a reduction of $763 on the price of last year.

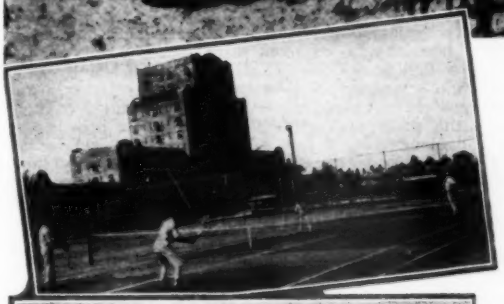
The 50-80 H.P. Cruiser & Runabout engine is also materially reduced. The price in 1920 was $3,700, the price in 1921 was $3,330 and the new price just announced is $2,450, or a reduction of $880 as compared with the price of last year.

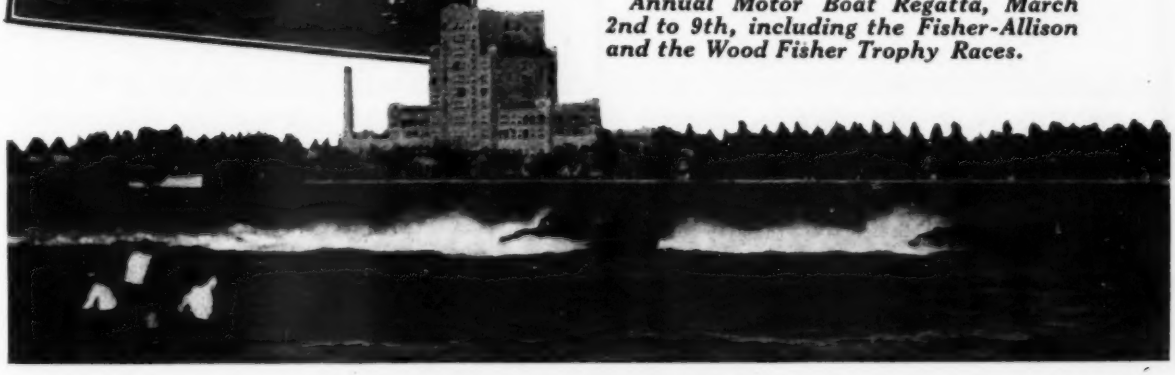
Material reductions have been made in the price of most of the Heavy Duty models; for instance, the price of 26-30 H.P. Heavy Duty, which in 1920 was $2,650 and in 1921 was $2,385, is now quoted at $1,675, in other words, a reduction of $710 over the price of last year.

(*Continued on page* 190)

Live and Play at MIAMI BEACH







MIAMI BEACH is the great winter playground for outdoor loving Americans. A garden spot of Nature where active interest never wanes, the days are never long enough because there is so much to see and do, such variety of entertainment and recreation to make life full.

The climate is ideal, the suroundings beautiful. Added to these are perfect facilities for boating, bathing, fishing, cruising,—for tennis, polo, golf, motoring and all outdoor activities.

Good hotels and attractive furnished bungalows make it a place to live as well as to play. Permanent residences at Miami Beach are available in desirable restricted sections.

Let Miami Beach be your winter home, this year and every year.

Write for booklets.

CARL G. FISHER

MIAMI BEACH FLORIDA

Annual Motor Boat Regatta, March 2nd to 9th, including the Fisher-Allison and the Wood Fisher Trophy Races.

CRESCENT

Genuine St. Lawrence River

SKIFFS

Better Boats—
Lower Prices

Genuine St. Lawrence River Skiffs and Outboard Motor Boats. These only—and these RIGHT in quality, workmanship and PRICE.

Specializing enables us to offer these high grade boats as follows:

St. Lawrence River Skiff (double ender), Style S. B., 16-footer, 42-inch beam—$90.

Outboard Motor Boat, Style O. B., 16-footer, 48-inch beam—$140.

Including oars, war tax and crating.

Styles S. A. and O. A., built in 16-foot and 18-foot lengths, are a little more elaborate, at a little higher price.

Orders placed now will insure delivery when wanted. Immediate shipments for southern use.

See these boats at the Show

Catalogues with full details on application to

CRESCENT MOTOR BOAT CO.

Clayton, Thousand Islands, N. Y., or New York Office, 461 Eighth Avenue (Room 1402), where boats are displayed

CRESCENT BOATS

Back to Miami

OUT of the frozen north, down the east coast to a wonderful land of sunshine and flowers. Back to Miami, where old memories will be revived, old friendships renewed. A royal welcome awaits you.

Upon your arrival in Miami, one of your first considerations will be your banking connections. If you are not one of our old customers, you will be pleasantly surprised to find that the service and facilities of this bank are as complete in every way as those to which you have naturally been accustomed.

It will be a pleasure to serve you during your stay in Miami.

FIRST NATIONAL--BANK

Capital, Surplus and Profits over $500,000

N. E. 1st Avenue, Next to Post Office

MIAMI, FLA.

Correspondence Course Comes to a Close

(*Continued from page* 25)

York City; Frank P. Huckins, East Boston, Mass., John K. Murphy, New Haven, Conn., G. W. Schaeffer, Chicago, Ill.; Dean Potter, New York City; H. M. Williams, New York City; Walter Groszman, Bayside, L. I.; A. B. Durvee, New Rochelle, N. Y.; F. T. Lander, New York City; A. B. Dessow, New York City.

The entire Correspondence Course is to be published in book form and will be ready for distribution about Feburary 15.

We now have an announcement to make which we know will be received with interest. We have arranged for another Correspondence Course which will be just a step in advance. The subject will be Dead Reckoning. Dean Potter of New York, without doubt the world's foremost amateur navigator, will conduct the new course. Up to now there never has been a satisfactory book written on the subject of dead reckoning. This branch of navigation has been sadly neglected, an unfilled gap, so to speak, between the elementary branches and the more advanced science of astronomical navigation. Many excellent works have been written on the latter branch so that there is no need of attempting to trespass on that field. But on Dead Reckoning we will produce something which will be new as well as a masterpiece.

Mr. Potter has a way of being able to explain his subject in a most understandable, as well as an interesting manner. He is Chairman of the Board of Instruction of the United States Power Squadrons and has done much to bring that organization to its high state of perfection and efficiency.

By dead reckoning, one's course and position at sea is determined without the aid of fixed marks such as aids to navigation, buoys, lighthouses, etc. This is accomplished by means of right angle triangles, as a certain definite relation always exists between the sides and angles of all right angle triangles. Therefore, the study of dead reckoning consists primarily of learning and memorizing a few of these functions. After this has been done all problems in dead reckoning are very simple and easily solved.

The rules for the new course will be the same as for the one just completed. Those desiring to enroll should send us their names. The questions will be printed in the issue following the lesson itself and all the other arrangements will be exactly the same.

The following whose papers were received during December, have passed:

Lesson No. 1: Charles A. Baker, Milton C. Bergey, Geo. T. Brooks, William Baumgart, Albert Copping, K. DeHart, Crawford Hoke, Chauncy L. Mitchell, Jr., William E. Moore, F. W. Mosteller, Wm. Harry Palmer, John P. Turcotte.

Lesson No. 2: Milton C. Bergey, Albert Copping, K. DeHart, Chauncy L. Mitchell, Jr., H. A. Nelson, Wm. Henry Palmer, D. E. Trefry, Charles H. Winter.

Lesson No. 3: Milton C. Bergey, Neal V. Gillespie, Forrest D. Greene, H. A. Nelson, D. E. Trefry.

Lesson No. 4: H. A. Nelson, J. K. Sexson, W. Blood Smyth.

Lesson No. 5: Will B. Barnett, E. C. Barnes, Seymour Houghton. L. F. Merritt, H. A. Nelson, Cory A. Philpott, J. K. Sexson, H. H. Sellew.

Lesson No. 6-7: Seymour M. Bradley, L. F. Brower, Leslie F. Chapman, H. A. Nelson, S. E. Slocum.

Lesson No. 8: A. R. Burr, L. L. Crosthwaite, Leslie F. Chapman, H. Greinert, Kenneth Gess, Walter Slocum, B. F. Smith.

Lesson No. 9: Jos. Bister, W. A. Cornell, Clarence W. Culver, J. Dunbaugh, W. H. Goodman, H. Greinert, Carl Holzkamp, F. D. Kelle, D. C. McClean, O H. Sherbrook, Walter Slocum, O. A. Thomas.

Lesson No. 10: R. Andren, Percy Benedict, Dr. A. B. Bennett, Jos. Bister, W. G. Boyden, Michael Cibener, W. A. Cornell, Leslie H. Chapman, I. S. Ellsworth, Vincent Francis, Chas. E. Grush, J. A. Howland, Geo. R. Law, Jr., W. B. Landreth, P. F. McMahon, Edward Mathews, L. McKenzie, H. H. Morton, H. A. Nelson, Dr. J. F. Schefcik, Walter Slocum, Morton Stelle, O. A. Thomas, D. E. Trefry, Dr. H. E. Watkins, L. E. Wilson, William O. Yates, C. S. Young, E. T. Youngfelt, H. T. Zachgo.

Fay & Bowen Boat for Kenilworth Lodge

The Fay & Bowen Engine Company of Geneva, N. Y., recently sold one of their complete power boats to Kenilworth Lodge, Inc., the new hotel located on Lake Jackson, at Sebring, Florida. Shipment of the boat was made the latter part of December and during the Winter it will be at the disposal of the guests of Kenilworth Lodge at this delightful Southern resort.

Advertising Index will be found on page 192

Carry Boat Power with You

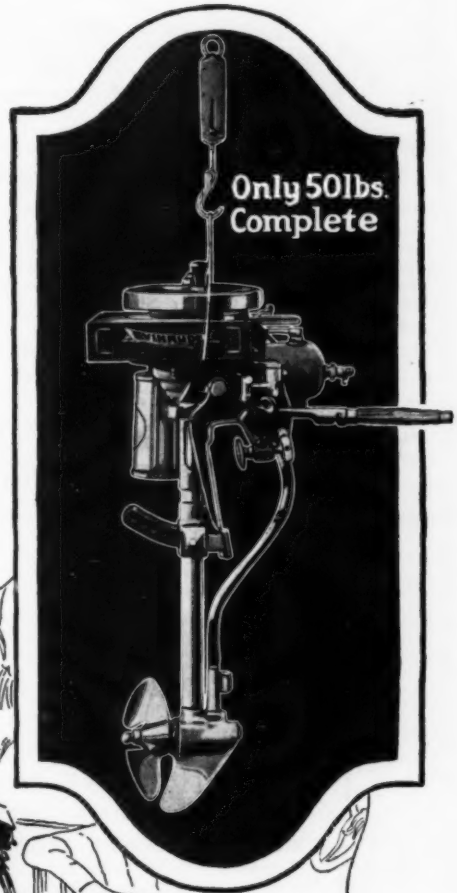
YOU motoring sportsmen, you whose fishing, camping or hunting trips turn week-ends and holidays into delightful vacations—the new Evinrude "Lightweight" is your wish come true. An Evinrude—the same sturdy, dependable "stern kicker"—*twenty-one pounds* lighter, so you can carry it handily in car, train or trolley.

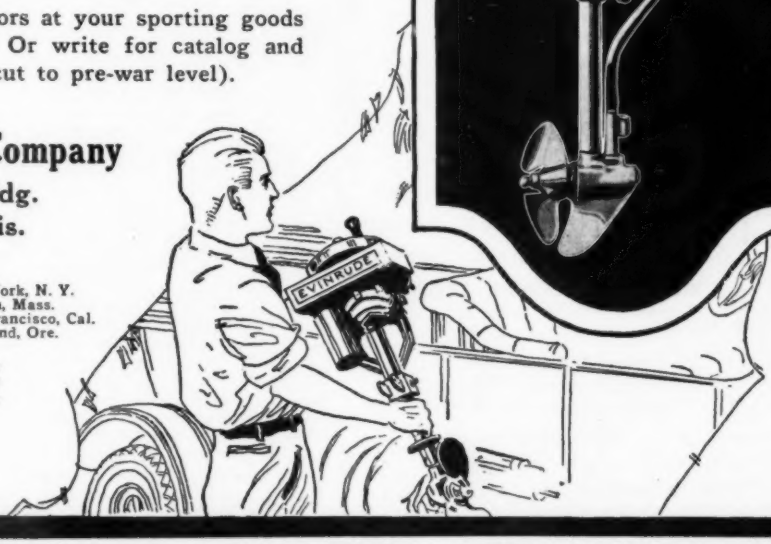
Light, strong aluminum alloys, replacing many bronze and malleable parts, have brought the total weight just under 50 pounds *complete*. No heavier than a good string of fish.

You can't find a handier power plant for dinghy or tender than this new Evinrude sport model. Easier to lift—more quickly attached or detached. Clamp it to any small craft and you save time and oar-work, carrying guests or supplies between shore and anchorage.

The "Lightweight" has the same wonderful power and speed as the standard 2 H. P. model, famous throughout the world. While not designed for such rugged service, it is a true Evinrude, husky and durable.

See the Evinrude motors at your sporting goods or hardware dealers. Or write for catalog and new prices (recently cut to pre-war level).





Evinrude Motor Company
619 Evinrude Bldg.
Milwaukee, Wis.

DISTRIBUTORS:

69 Cortlandt Street	New York, N. Y.
780 Commonwealth Avenue	Boston, Mass.
440 Market Street	San Francisco, Cal.
211 Morrison Street	Portland, Ore.

See the Evinrude Exhibit at National Motor Boat Show, Grand Central Palace, New York City, February 17th to 25th.

EVINRUDE "LIGHT-WEIGHT"
DETACHABLE MOTOR FOR WATERCRAFT

STEARNS-McKAY

MARBLEHEAD

ANTI-FOULING GREEN BOTTOM PAINT

FOR STEEL OR WOOD STAYS CLEAN

For Racing and Cruising Yachts and Vessels

Increases speed, saves fuel and large expense bills. A hard and peculiar slippery finish which lasts a long time. It pays for itself many times over by eliminating cos ly repairs, scraping and repainting work. It is a powerful wood preservative and anti-fouler, and is equalled only by Copper Sheathing as a protection against Teredos.

For Topsides — Full and Semi-enamel Yacht white

Advice and consultation free on all painting and repair work.

STEARNS-McKAY MFG.CO

MARBLEHEAD, MASS. U.S.A.

Power-Boat Prizes

THE most important gold and silver power-boat awards competed for in recent years were designed and made by this house.

Designs and estimates promptly submitted for prizes to suit special requirements

Large assortments of bowls, loving cups, vases, etc., are carried in stock.

J. E. Caldwell & Co.

JEWELRY SILVER STATIONERY

PHILADELPHIA

When My Ship Comes In

(*Continued from page* 68)

industry. There is the Blacksmith's shop, for example, with its steam hammers, yet less than a stone's throw away cabinet making is being done where the craftsman's skill cannot be replaced by mechanical operations. Like a French "atelier" is the atmosphere of this room, where beautiful woods are worked up into furniture panels and other fittings of comfort and luxury.

* * *

The Machine Shop and the Motor Testing Shop call to mind the activities of the automobile industry in Detroit. Here the Speedway Engine is produced in its entirety. Not far distant, in the Plumbing Shop, the ship's plumbing and copper work, such as ventilators and tanks, are made.

Like the view of Pittsburgh are the Shipbuilding Ways, with their great overhead cranes, where steel yacht work and commercial vessels are constructed. For craft up to one hundred feet there are separate ways.

The landlubber may not appreciate all the operations necessary to turn that "painted ship" into a vessel sturdy enough to stand storm and wind, but the Showroom of Consolidated is a place where even the other "nine out of ten" would be compelled to linger. Broadway, with its Automobile Salons, has no such appeal as these finished Runabouts, in stock models, superbly equipped for comfort and speed and ready at moment's notice to take the salt highway where no traffic cop's warning signal is yet heard.

* * *

There is no doubt but that the developments in the automobile have revolutionized the Runabout type of motor boat. The old fashioned "launch" has undergone a wonderful improvement. Here you sit before a wheel exactly like your Pierce Arrow or Rolls Royce, and on a similar dash before you are the same intriguing controls to respond instantly to your will.

How many persons who have learned the joys of land motoring are still unaware of the greater thrill of motoring by sea, river or lake. Will these modern boat builders have one day to invade "Automobile Row" with their Runabouts and Express Cruisers, to fan indifference into an irresistible desire? The average person, of course, has come to look upon a motor car as a necessity, while he still regards the motor boat as a luxury. But a "necessity" is frequently but a luxury which has been justified by common usage.

The future of motor boating, therefore, may be regarded as full of promise by all lovers of this most ancient and royal of sports. It is inconceivable that the technical improvements made in the operation and comfort of motor craft will not create a correspondingly broader demand, just as has been done by the motor car. One suggestion is that an effort be made to interest groups of people to go into the sport with one boat, just as groups take up golf with one links. No more companionable sport exists than cruising, and the club ownership of a cruiser, with an adequate club house, offers "the freedom of the sea" to thousands who would be unable to swing it alone.

* * *

You only have to walk through Central Park to see how innate is the love of boats. Take that little pond away, however, and the kiddies would take up some other game. On the other hand, give New York a half dozen similar ponds, and just as many more little skippers would be produced. Thus the development of motor boating, to a rank outsider at least, seems to depend on a more or less cooperate movement on the part of everybody concerned, to bring the sea to Broadway, since Broadway knows so little of the joys of the sea. This has been accomplished by the Motor Boat Show to a certain extent—but the Automobile Industry would never earn its bread and butter if it depended upon annual Shows alone.

But to return for a moment more to the Consolidated Shipbuilding Plant, where these suggestions occurred to the writer.

Anyone at all acquainted with industrial achievement in other fields, knows that such power of coordinated effort as is evident in this combined woodworking and metal working establishment, must have come about as a slow process spread over years of growth.

* * *

And this is the case. The history of Consolidated Shipbuilding Corporation began in 1885, when Mr. F. W. Ofeldt, an inventor, designed the Naphtha Engine. The naphtha engine, of course, gave the greatest stimulus to the development of pleasure craft, as well as the smaller types of commercial vessel.

Since 1885, the Consolidated Plant, combining the Seabury Company and the Gas Engine and Power Company, have built 3,000 hulls, and at the present time their facilities for pleasure craft construction rank second in the world, the only larger organization of the kind being in England.

Advertising Index will be found on page 192

Inverted V-bottom and Surface Propeller Boats.

SEA SLED

Hickman Patents in all countries.

Trade Mark Reg. U.S. Pat. Off. Trade Mark Reg. Canada

THE progress of Sea Sleds during 1921 marks the most successful development ever achieved by a boat builder in the period of one year.

With many seasons of experimental work behind them, with many brilliant exploits already to their credit, Sea Sleds entered 1921 with the development stage fully completed, the manufacturing stage for general use still to be accomplished.

During the past season a complete boat building plant has been acquired, and a new company organized for purposes of regular production. In the meantime, the 1921 production of Sea Sleds has established a series of world's records in number and importance never before held by a single boat builder.

Marathon 46-47 miles per hour

Marathon is a 30 ft. runabout owned by Mr. Henry B. Plant, of New London, who uses her as a tender for his sailing yacht, "Spartan," and for fast ferry service to New York and Long Island.

Marathon has made numerous runs between New London and Glen Cove, Long Island—approximately 80 nautical miles — carrying seven or eight passengers per trip without crowding. The run requires about two hours and twenty minutes, running steadily at 31 knots. Power equipment is a pair of 200 H.P. six cylinder Hall-Scott marine motors.

Orlo II carried eleven passengers better than 40 M.P.H. in qualifying for the Fisher Trophy races at Miami. No other fast boat (excepting other Sea Sleds) has such capacity and weight carrying ability

Orlo II, 36′ x 7′ powered with two GR Six Sterlings. The fastest marine-engined displacement boat ever built until succeeded by Orlo III. Carrying capacity 20 persons

World's Displacement Boat Records for 1921

Fisher Trophy Series, Miami, Florida, February, 1921

1. One mile trials:
   Orlo II, 47 statute miles per hour.
2. Two mile lap record, with 4-buoy turns:
   Orlo II, 40 statute miles.
3. 50 miles, 2 mile course, with 4-buoy turns:
   Orlo II, 38.8 statute miles.

Fisher-Allison Trophy Series, Buffalo, August, 1921

4. One mile trials:
   Orlo III, 57.799 statute miles per hour.
5. Two mile lap record with 1-buoy (hairpin) turns:
   Orlo III, 41.6 statute miles per hour.
6. 50 miles, 2 mile course, with 1-buoy (hairpin) turns:
   Orlo III, 39.8 statute miles.

Wood-Fisher Trophy Series, Detroit, August 30, 1921

7. 2½ mile lap record, with 4-buoy turns:
   Orlo III, 47.11 statute miles per hour.

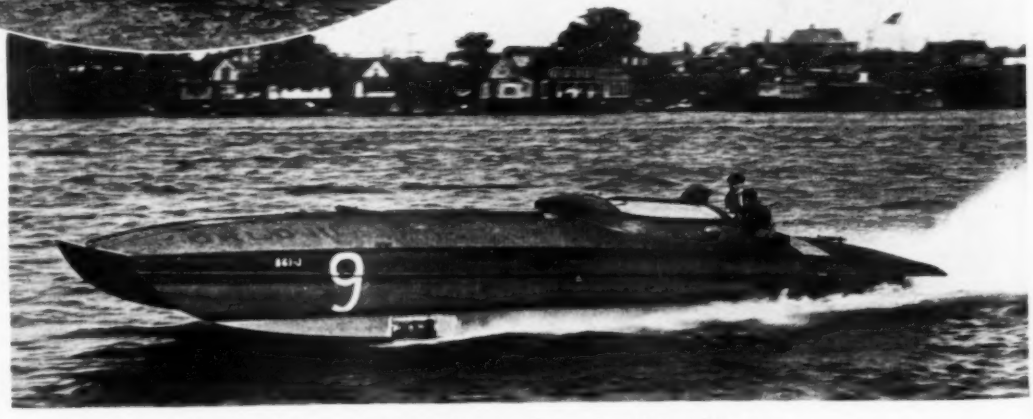
Gold Cup Series, Detroit, August 29, 1921

(Not in competition with displacement boats.)

8. 5 mile lap, with 4-buoy turns:
   Orlo III, 50.15 statute miles per hour.
9. 30 miles, 5 mile course, with 4-buoy turns:
   Orlo III, 48.2 statute miles per hour.

Orlo II and Orlo III heralded a new type of motor boat possessing great speed with large carrying capacity, shallow draft and practical serviceability. All displacement boat records are held by these Sea Sleds, with the exception of those made when the Sleds were not running through mechanical trouble

Even at 50 M. P. H. the passengers in Orlo III ride in comfort, free from flying spray



Orlo III holds the world's record of 57.799 statute miles per hour for marine-engined displacement boats

Advertising Index will be found on page 192

Marathon at speed. The outstanding advantages of Marathon are the large passenger capacity, the sustained high speed and the dryness, safety and all-around riding comfort in a choppy sea. Boats of the Marathon type are ideal for fast tenders or pleasure runabouts

THAT the many exceptional qualities of Sea Sleds are appreciated by experienced motor boatmen is evidenced by the following interesting letter written by Mr. Harry Greening, owner of Rainbow I and Rainbow II. Mr. Greening's intimate acquaintance with the conventional form of hull in its highest development such as the Rainbows lends weight to his judgment of Sea Sled qualities.

"Hickman has invented a type of boat that is more seaworthy and will carry more load, and at the same time is much faster and more efficient than anything in the world that I know of.

"My Boat 'Rainbow' which I have lately sold, according to competent European and American critics, is the finest boat of her type that has been built and when I owned her held the world's record of 41.8 miles per hour. She has since increased it to 44.02 miles per hour officially. This constitutes a record for any type displacement boat powered with one marine engine. Her weight is about 18 pounds per H.P., including crew of two. She will carry five people in ordinary water, but not where it is rough. Bearing in mind that it is a question of weight per H.P. that up to the present time has absolutely determined miles per hour, along comes Hickman with a craft weighing 26 pounds per H.P. and capable of carrying from 20 to 25 men, in water that the 'Rainbow' could not live in for one minute. He can run through weeds, shallow water and so forth, where the entire underworks of the 'Rainbow' would be swept off.

"I refer to the Sea Sled 'Orlo II' which had a speed of 47 m.p.h., with a quarter more weight per H.P. than my boat.

"He took me out into the Atlantic Ocean well into the Gulf Stream, and ran her full speed with twelve aboard. Our mechanicians on the 'Rainbow' were trying to coax her out of the harbour, but we had to return owing to rough water.

"After we came back from Florida I got Prof. George Crouch to design a boat for me for the 'Fisher Trophy' race in Buffalo that would incorporate Hickman's surface propeller drive. While admitting the superior seaworthiness and weight carrying ability of the Sea Sled, both Crouch and I felt that the great speed resulted from the use of surface propellers. We had to have a boat that would turn quickly for the 'Fisher Trophy' course, and the Sea Sled hull of the type to make quick racing turns had not been developed.

"The new boat was named 'Rainbow II'. Hickman licensed us to use surface propellers and they were placed in a tunnel well forward of the rudders. We wanted great turning ability and got it. While conforming with the 'Fisher Trophy' rules, the boat was practically a step hydroplane. She developed a speed of about 52 m.p.h. miles better than the screw propeller boats of similar weight.

"At the Buffalo Races Hickman appeared with the Sea Sled 'Orlo III'. She had about the same relation of power to weight as either of the 'Rainbows' but she made an official speed of 57.8 m.p.h., five or six miles faster than 'Rainbow II'. With our throttles wide open in 'Rainbow II', 'Orlo' would run away from us at the speed of an ordinary launch. To my mind this settled the efficiency question in favor of the Sea Sled form of hull.

"I have talked with Hickman on this subject and if his explanation of the way the bottom of the Sea Sled hull is kept free from adhesion of the water is correct, as it appears to be, it seems probable that in none of the older forms of boat where water is thrown out at the sides, can we hope to approach the efficiency of the Sea Sled.

"In Buffalo the Sled ran smoothly and without pounding in a heavy chop where the other boats were badly handicapped.

"I always try to keep an open mind on these subjects so that I do not have to fight the inevitable, and after the closest observation extending over some years, I will say that the Sea Sled idea combined with surface propellers is the most efficient thing ever developed. Hickman has, at one stroke, turned things all topsy-turvy in the motor boat world."

(signed) H. B. GREENING.

This passenger carrying Sea Sled at Atlantic City has demonstrated to thousands of visitors the thrill of skimming over the waves at 40 to 45 miles per hour. 40′ x 7′ 9″, powered by two 225 H.P. Sterlings. Capacity 24 passengers

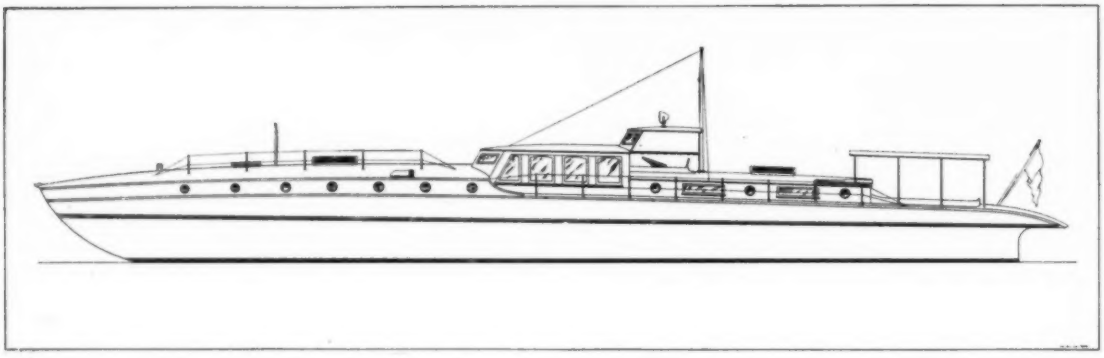
Sea Sled development is also progressing in England, licensed under Hickman patents. This is one of three 42 foot Sea Sleds built for Mr. Claude Graham White. Capacity 30 passengers. Rolls Royce engine

Inverted V-bottom and Surface Propeller Boats.

SEA SLED

Hickman Patents in all countries.

Trade Mark Reg. U. S. Pat. Off.



4 Engine Sea Sled Cruiser

For

Mr. Henry B. Plant

The Sea Sled is not essentially a racing boat, nor even a speed boat within the commonly accepted meaning. It is a new type of hull, equally suited for runabout or racer, cruiser or work boat. It is the first marked improvement in naval architecture in centuries of boat building.

The distinctive features of the Sea Sled are its inverted V-bottom hull, surface propellers and side plate rudders. This form of hull possesses more and greater advantages than have ever before been combined in one boat.

1. **Better Seaworthiness**
2. **Higher Efficiency**
3. **More Comfort**
4. **Shallow Draft**
5. **Large Carrying Capacity**
6. **Great Speed**

Mr. George F. Crouch

Head of the Webb Naval Academy

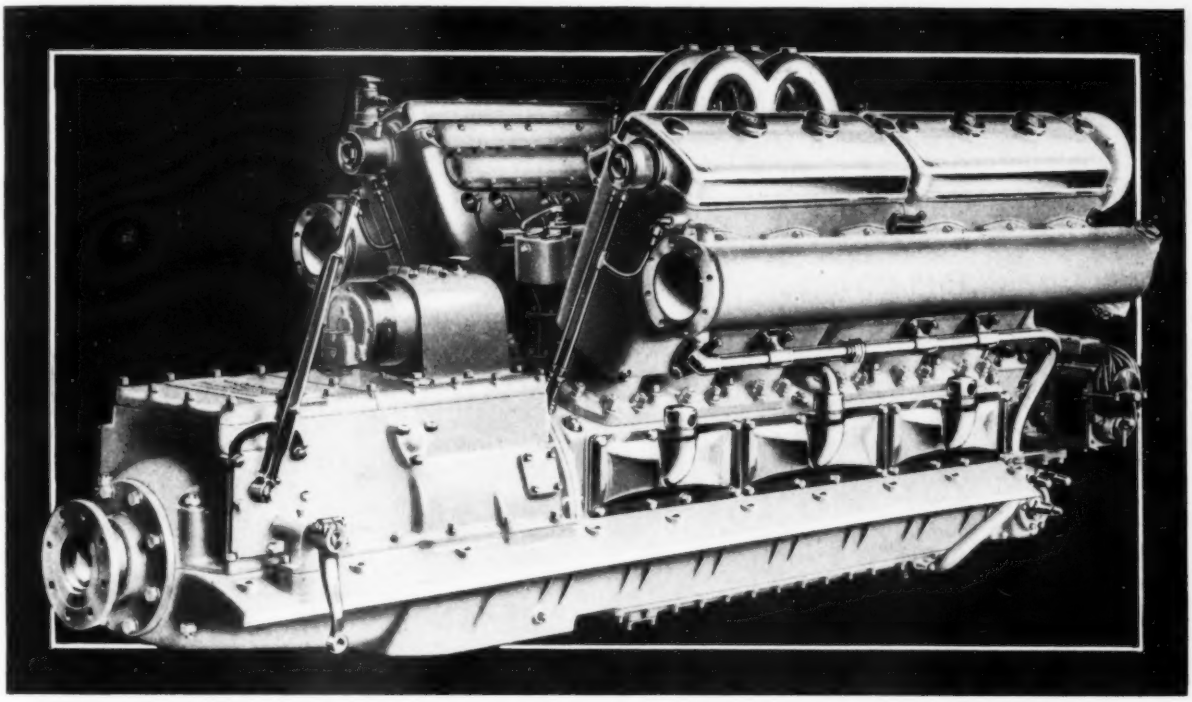
Designer of Rainbow I and Rainbow II. One of the world's foremost designers of motor boats and the leading motor boat authority in America. Mr. Crouch has given up the development of all other types of boats to devote his designing ability to Sea Sleds exclusively.

If demonstrated efficiency is the measure, the Sea Sled is the ultimate type of motor boat. If you are interested in owning an exceptional boat, it will be a pleasure to give you more detailed information without obligation.

THE SEA SLED COMPANY, Ltd.

WEST MYSTIC, CONN., U. S. A.

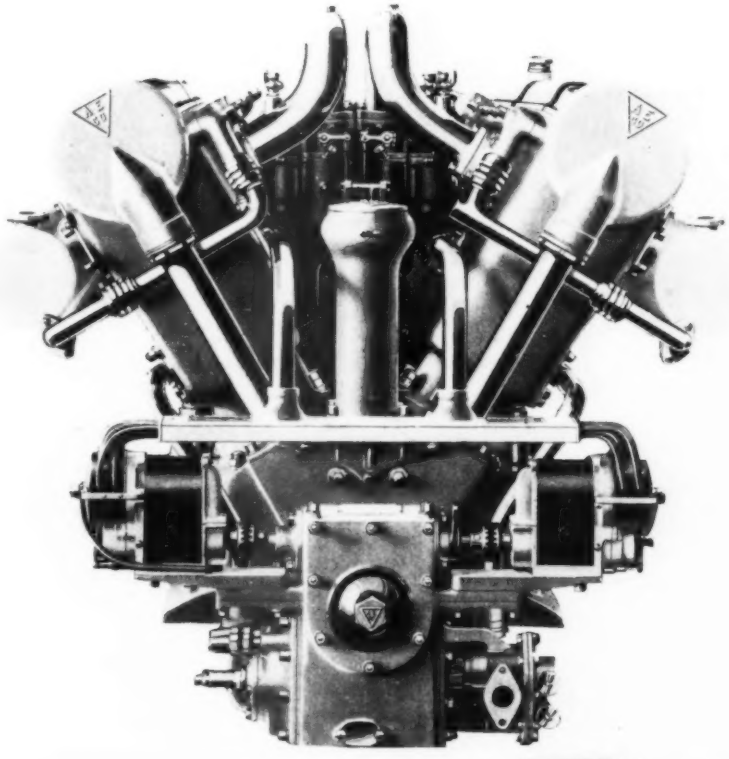
Advertising Index will be found on page 192



ALLISON

The Masterpiece of Marine Motor Engineering

A E CO



THE Allison is built for those yachtsmen who want and can afford the best marine power plant that skill and money can produce.

Its price of $25,000 insures that each Allison is a masterpiece of workmanship, just as the design is a masterpiece of engineering.

It is neither built nor priced to meet competition, in fact it has no competition. There is no other marine motor built to the same standards or the same ideals.

You will realize this in part after reading the following pages. Only a thorough inspection or acquaintance with the Allison in operation can reveal the marked advance over past standards.

ALLISON
ENGINEERING COMPANY
Indianapolis Indiana

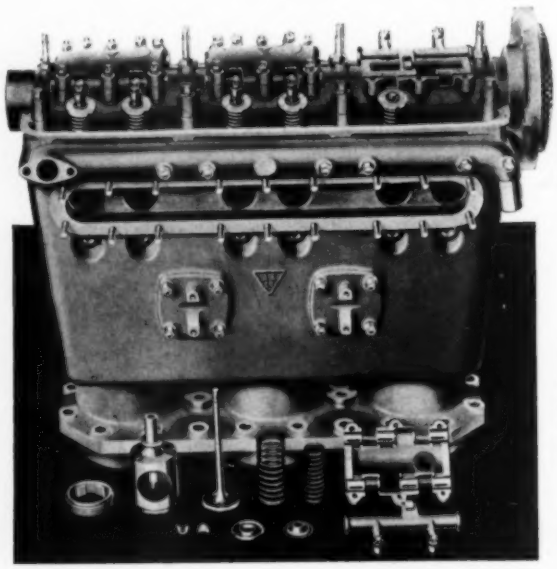
AE CO

ALLISON

THE Allison is the result of three years of conscientious effort to produce the highest type of marine motor possible to build. We realize that the market for such a motor is limited. Quantity production is not intended—but quality production is assured.

The perfection of the Allison is the result of the perfection of each minute detail and part that enters into its construction.

Built for single and twin screw installations.



A cylinder unit of the Allison Twelve, cast three enbloc. Note that overhead camshaft operates directly on the rocker arm rollers. Note the great bearing surface of each rocker arm shaft. Four valves in each cylinder, two springs on each valve, removable cage for each valve. Three spark plugs in each cylinder.

SPECIFICATIONS OF THE ALLISON TWELVE

4-cycle, 60° Vee type, valves in head, overhead camshaft. 12 cylinder, 5½" x 7½", 2138 cu. in. piston displacement. 1000 to 1500 R.P.M. Weight, 4400 lbs.

300	H.P.	at	1000	R.P.M.
325	"	"	1100	"
350	"	"	1200	"
375	"	"	1300	"
400	"	"	1400	"
425	"	"	1500	"

Crankshaft: Hollow, seven-bearing type, 3½" dia. Main bearings 2½" long except center and after main bearings which are 4" long. Crank pins 3 3/16" dia., 3⅜" long. Shaft forged from chrome-nickel steel, heat-treated, machined all over and balanced.

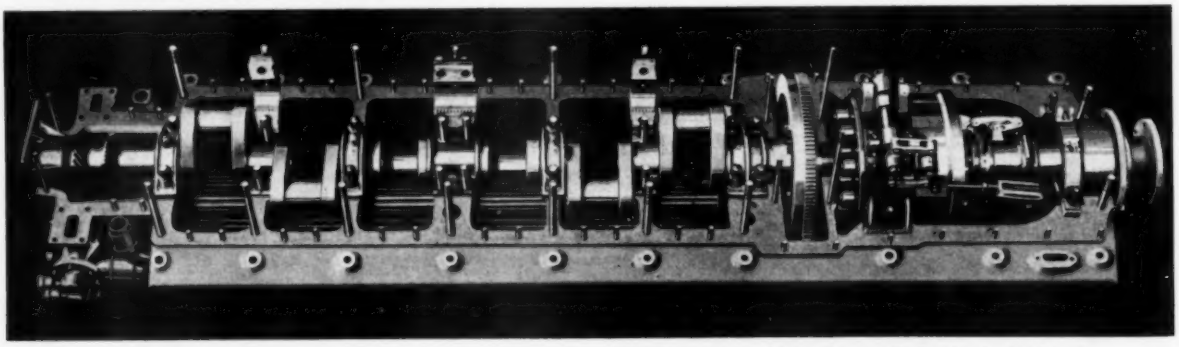
Connecting Rods: Forked pattern. I-beam section, length 15" between centers. Drop-forged chrome-nickel steel, machined all over.

Bearings: Main and connecting rod bearings generous size, Non-Gran bronze lined with high grade babbit by centrifugal process.

Pistons: Carefully designed for lightness and heat conductivity; floating piston pins 1⅝" dia. Four rings above piston pins. Bottom ring beveled to act as wiper; oil groove in pistons drilled to return oil back into crankcase.

Crankcase: Lower half cast manganese bronze carries main bearings. Upper half cast aluminum alloy. Well ribbed and very rigid. Large hand-holes for inspecting, adjusting or removing main and connecting rod bearings.

Cylinders: Cast in blocks of three, close-grain semi-steel. Water distribution around heads carefully worked out to give thorough and uniform cooling. Ample water space provided around valve seats, valve stems and spark plugs. Three spark plugs in each cylinder. Cylinders bolted to upper half of crankcase. Between each cylinder and at ends through-bolts clamp the cylinder flange through upper half of case to lower case, making a very strong and rigid assembly. Cylinder bolts and studs chrome-nickel steel, nuts nickel steel case-hardened.



The Allison base makes the reverse an integral part of the motor. Note the small flywheel, the large all machined crankshaft and liberal bearings with a main bearing between each pair of crank throws.

Advertising Index will be found on page 192

The Highest Priced Marine Engine

WHAT has been accomplished in the Allison? A greater degree of dependability than ever before attained in any marine engine, demonstrated by Allison performances in "Sea Horse," "Aye, Aye Sir," "Altonia II" and others. Smoother operation at any speed than ever achieved in any other internal combustion motor. Likewise greater fuel economy, certainty of performance and freedom from annoyances, major or minor. The Allison is not a high-strung racing creation. Maximum performance sustained.

SPECIFICATIONS OF THE ALLISON TWELVE

Valves: Each cylinder has two intake and two exhaust valves 2" diameter in the clear with 30 degree seats. Exhaust valves seat directly in the cylinder head, intake valves in cages. Intake valves lift 13/32"; exhaust valves lift 3/8". Valves tungsten steel or high chromium steel. Double valve springs on all valves. Each pair of valves operated by a rocker arm, one end of which carries a roller operating directly on camshaft.

Camshafts: Overhead type driven with bevel gears and vertical shafts at forward end of engine. One camshaft for each bank of cylinders. Cams integral, case-hardened, accurately ground. Camshaft hollow, oiled by pressure.

Lubrication: Pressure feed with dry sump. Oil pump gear type. Pressure regulating valve at pump may be adjusted while engine is running. A pair of gears draws oil from oil tank and pumps it into hollow crankshaft, from which it is distributed to hollow camshaft and all bearings. Another pair of gears draws oil from sump and returns it through oil cooler to tank. Oil is strained in tank, passing through two removable strainers of large size. Oil cooler is for continued runs at full throttle. Under normal running sufficient cooling is obtained in lower crankcase, bottom of which is water-cooled for this purpose, and the cooler is by-passed.

Cooling System: Water pump gear type, especially designed for high capacity and efficiency. Water drawn from the sea through oil cooler and delivered to pan on bottom of crankcase from which it goes to cylinders. Water outlet manifold is connected with water-jacketed exhaust manifolds.

Ignition: Two six-cylinder, two-spark magnetos firing two plugs in each cylinder. Third plug fired by battery. Magnetos located at forward end of engine driven by spiral gears and cross shaft from crankshaft. Spark advance is obtained by sliding spiral gear on splined cross shaft.

Carburetor: Accessibly located in center of Vee. Gasoline strained through special duplex strainer, one strainer screen may be removed and cleaned without interfering with operation of the engine. Crankcase breathers piped into carburetor air intake to draw fumes back into engine. Air taken in through large air intake so designed that any drip from carburetors is caught and drained over-board.

Accessory Drives: Magnetos, oil pump, water pump, generator and governor all located at forward end. Magnetos and pumps driven by spiral gears and cross shafts. A vertical shaft and bevel gears drive the governor and generator. Tachometer drive from forward end of crankshaft. Air pump for gasoline pressure feed driven from after end of one camshaft.

Starting System: Leece-Neville two-unit starting and charging system, 32 volts. Generator located in Vee at forward end. Starter mounted over reverse gear housing and operates a Bendix drive on flywheel through gearing. Starting motor turns engine over at sufficient speed to start from magnetos.

Governor: Centrifugal governor mounted at forward end, designed to close carburetor automatically when speed exceeds predetermined point. Up to this point control is full manual and direct to the carburetor.

The forked type connecting rods are drop-forged from chrome nickel steel, machined all over. Special light pistons with four rings. Note how the floating piston pins are held in place.

Clutch and Reverse Gear: Especially designed for this motor and built into the engine. Steel flywheel bolted to rear end of crankshaft forward of clutch and reverse gear. Forward clutch multiple disc using alternate steel and bronze discs of generous dimensions running in oil. Reverse gear planetary type. Clamping band operated by double screw and nut which insures positive engagement and disengagement. Entire reverse gear and clutch assembly lubricated by pressure feed from engine.

Thrust Bearings: Propeller thrust carried by two deep groove ball bearings located at extreme after end of engine. Lubricated from engine oiling system.

Cleanliness: All moving parts covered to insure safety and cleanliness. Ample oil seal and high grade gaskets used on all joints. Oil fumes and vapors drawn from the crankcase to the carburetor.

Economy: Careful design has resulted in an engine of excellent economy. Fuel consumption at full throttle .56 lbs. per h.p. per hour, oil consumption .02 lbs. per h.p. per hour. At normal cruising speed fuel consumption is .53 lbs. per h.p. per hour.

ALLISON ENGINEERING COMPANY

INDIANAPOLIS INDIANA

SPEAKING of standards and ideals, the ALLISON LITE stands in a class alone among electric generating plants.

The four-cylinder motor is designed and built especially for the purpose—not a converted marine, automobile or cyclecar engine.

The generator, switchboard and other components and instruments are also the best of their respective kinds, each having been selected not only for its inherent quality and excellence of construction but also for its particular suitability to the other units of the system.

ALLISON LITE installed in the boat disposes once for all of every question relating to the electric generating plant.

Capacities, 3 K. W. and 4 K. W. 32 and 110 Volts. Weight of unit, 530 lbs. Price complete except batteries, $2,000.

Detailed specifications on request.

ALLISON ENGINEERING COMPANY
INDIANAPOLIS INDIANA

Advertising Index will be found on page 192

STANDARD
REVERSE GEAR

THE Standard Reverse Gear with the *new multi-cone clutch* marks the greatest advance in reverse gear construction announced in the past ten years. At last you can buy a gear that combines easy engagement, positive disengagement and quick adjustability, with tremendous holding power, strength, durability and simplicity.

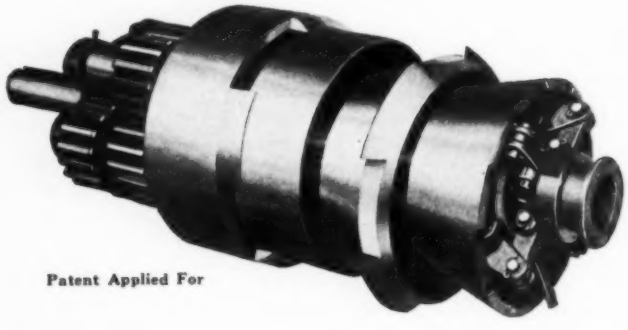
You'll like the Standard Gear with the new multi-cone clutch. Read about it on the following pages.

STANDARD GEAR COMPANY

5928 Commonwealth Ave Detroit Mich

STANDARD
"All the Name Implies"

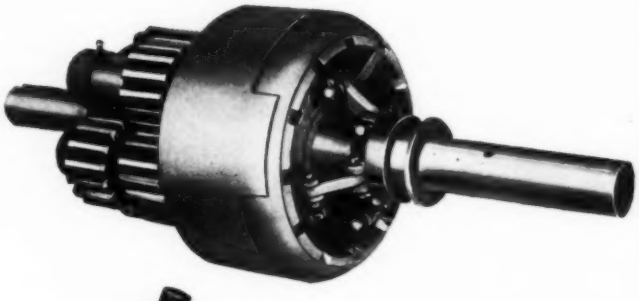
A Better



Patent Applied For

THE multi-cone clutch is an entirely new idea in reverse gear manufacture. Without departing from accepted and proven principles in the type of gearing, we have added a clutch that takes hold as smoothly as a steam engine, holds onto the load like a bulldog and disengages so completely there is no drag in the neutral position. The cones cannot buckle, warp, stretch or drag as discs do when great pressure is applied.

See the great friction surface. This means smooth engagement and unlimited holding power. You can purposely slip this clutch without damage. Long use simply improves its action because the cones lap more perfectly into one another; the longer they are used, the better they get.



The oil groove and packing makes this case oil-tight at every joint. Oil traps at the end of each bearing prevent leakage. The ball thrust bearing at the rear is an integral part of the Standard Gear.

Notice that the friction surfaces in this clutch are at the most effective point—the point of largest diameter. The toggle mechanism is inside the cone. The whole unit is very compact and represents the maximum of friction surface possible in the space it occupies.

When you have seen and tried this clutch you will never buy a reverse gear with any other type of clutch.

Advertising Index will be found on page 192

Reverse Gear

STANDARD

"All the Name Implies"

A Small Gear for Small Engines

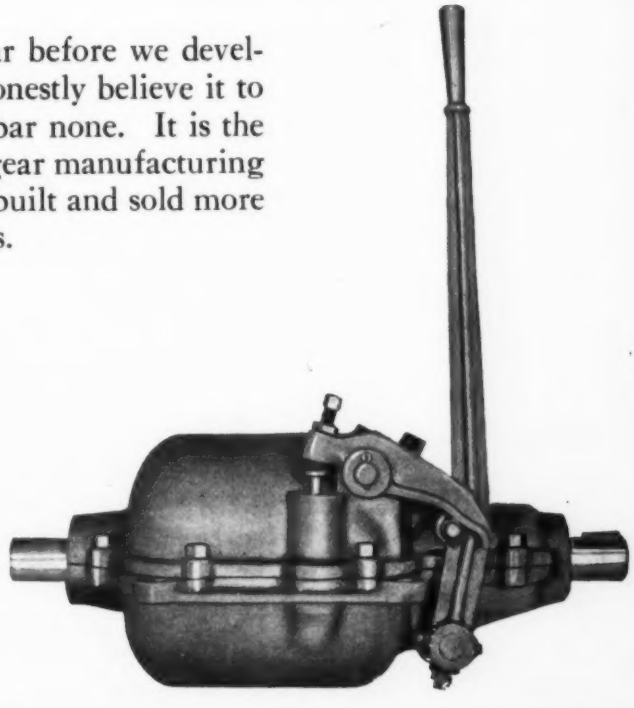
The Standard Midget. The smallest reverse gear made. It's a real Standard—ball bearing, thrust and radial; same as the larger multicone; holds 5 H.P. at 1000 R.P.M.

IN addition to its exclusive multi-cone clutch the Standard Gear possesses every other advantage you want in a reverse gear. It is compact, neat and clean, strong, simple, easy to adjust and always dependable.

The complete enclosure with oil tight case enables us to run this gear in a bath of oil, insuring perfect lubrication and the minimum of wear. The oil tight case keeps your boat and your clothes clean, and it looks better in the boat. It is handsome enough for any boat and any engine.

The Standard was a mighty good gear before we developed the multi-cone clutch. Now we honestly believe it to be the best reverse gear on the market, bar none. It is the result of more than ten years of reverse gear manufacturing experience, during which time we have built and sold more than 30,000 reverse gears for motor boats.

You can tighten the clutch from the outside of the case while the gear is in operation. You can take the gear mechanism apart and reassemble it without trouble because it is so simple. It does not take a mechanic to handle this gear or a machine shop to overhaul it. Perfect lubrication and simple adjustment make further attention unnecessary.



REVERSE STANDARD GEAR

"All the Name Implies"

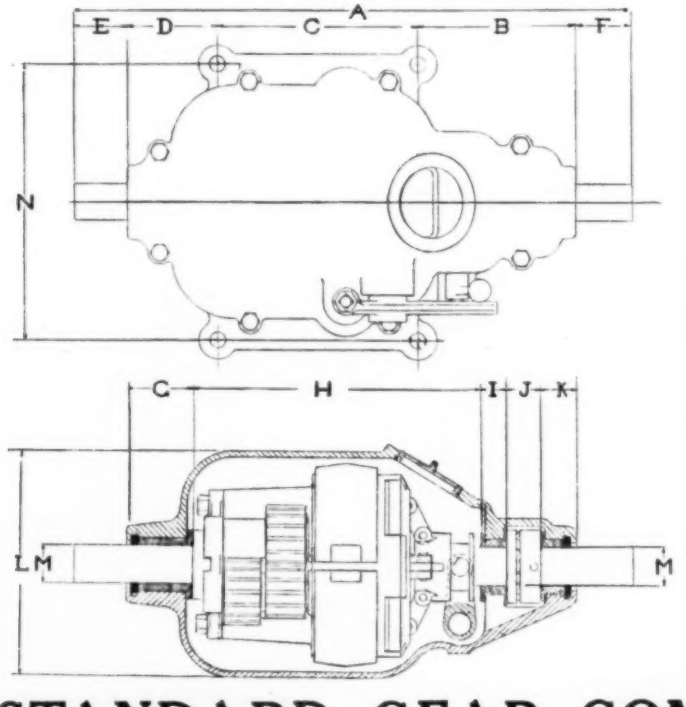
Join the Army of More than 30,000 Standard Gear Users

The Home of the Standard Reverse Gear.

CAREFUL consideration of the Standard and other gears will convince you that the Standard possesses the qualities you want. But you don't have to rely entirely on your own judgment in this because the Standard has been approved and purchased in the past by more than 30,000 other boat owners.

If your present gear is not giving you thorough satisfaction, take it out and put in a Standard. If you are building a new boat or buying a new engine, don't accept any old gear but specify a Standard. Installation details and dimensions are given below.

Engine Manufacturers, Boat Builders: Don't decide on your gears for 1922 until you have tested the Standard with the new multi-cone clutch. Try it out in your own shop. Let us know which size to send you for test.



GEAR TYPE	M	A	B	C	D
H.P. PER R.P.M.	.5	1.5	3.0	6.0	12.5
H.P.	20	55	75	125	225
PROP. SIZE	350	450	600	100	125
A	3¼	4⅝	5⅛	6⅞	7¾
B	3½	4⅞	5⅜	6⅞	7¾
C	1⅛	5⅛	6⅛	7	8¼
D	1⅛	2⅛	3⅛	3⅛	4⅛
E	⅜	1⅛	1⅛	2⅛	2⅛
F	⅜	1⅛	1⅛	1⅛	2⅛
G	1⅛	1⅛	2⅛	2¾	2⅛
H	4½	8¼	9⅛	11	13¾
I	⅛	1½	1½	1⅛	1½
J	½	⅛	1½	1⅛	1½
K	⅛	1¼	1⅛	1½	1½
L	4½	6⅛	7⅛	9¼	11½
M	⅛	1⅛	1¼	1½	1½
N	5½	8	9	11⅛	13

STANDARD GEAR COMPANY

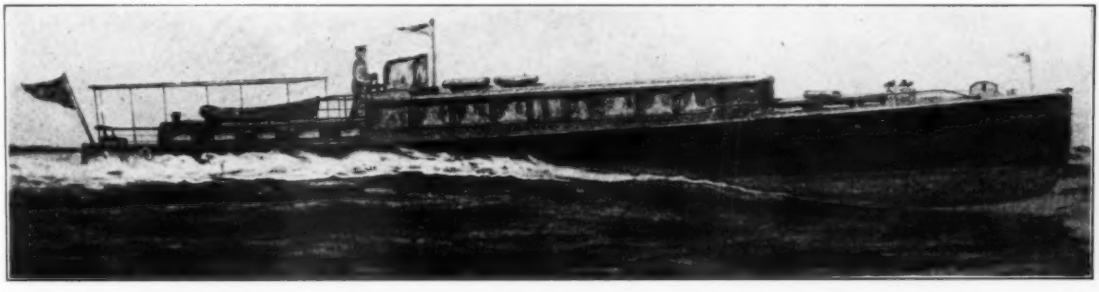
5928 Commonwealth Avenue **Detroit, Michigan**

Cable Address "Stangear"

Advertising Index will be found on page 192

FOR SALE

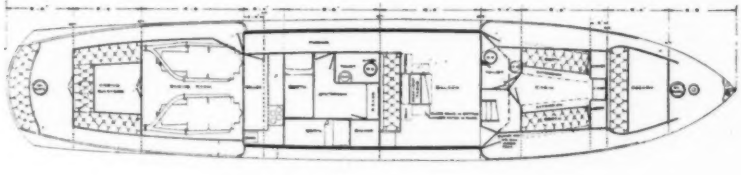
A Purdy Built Express Cruiser



Length 72 ft. **Beam 14 ft.** **Draft 3 ft.**

Speed guaranteed up to 33 miles per hour. A substantial and seaworthy express cruiser with double planked mahogany hull and walnut finish. This boat is now 80% completed, and can be finished and delivered on short notice.

If you are interested in a boat of this size and character, let us tell you more about it.



SHADOW V

Length 46 ft., Beam 10 ft. 4 in. Long Distance Express Cruiser Champion 1920—First Series. Owner, Mr. Carl G. Fisher, of Indianapolis and Miami

The ideals as well as the ability of the Purdy plant are shown by the class of express cruisers and fast runabouts we have produced. Such boats as Shadow V, Altonia and Altonia II, Sea Horse, Aye Aye Sir, and other famous Purdy boats combine high speed with excellence of design and beauty of finish.

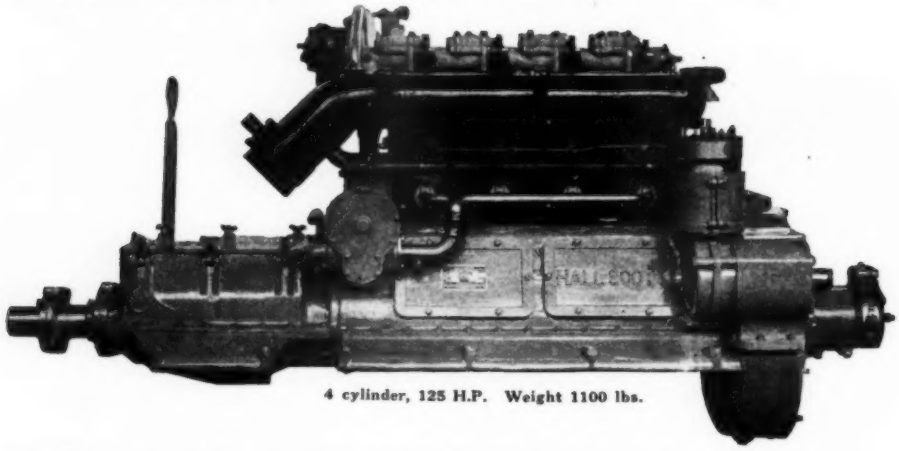
Our facilities and experience are entirely adequate for producing the finest boats that can be built. We have no desire to reach either standardization or quantity production. Each Purdy Boat is simply the best that can be produced in its size and type, regardless of the amount of time and labor involved.

Let us figure on your next boat.

PURDY BOAT COMPANY

Trenton **Designers and Builders of EXPRESS CRUISERS** **Michigan, U. S. A.**

HALL-SCOTT

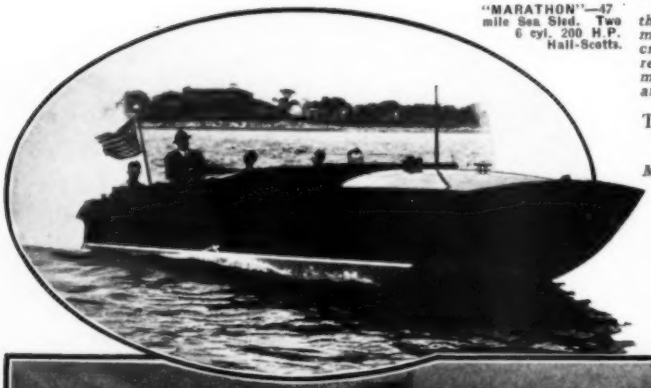


4 cylinder, 125 H.P. Weight 1100 lbs.

THE unvarying success of Hall-Scott Marine Engines in both runabouts and cruisers has proved that the high speed motor boat is entirely practical from the standpoints of service and reliability, if equipped with a power plant properly designed and built for the purpose.

Superior design, more suitable materials and better workmanship has made Hall-Scott engines lighter in weight and more enduring in service than any other high speed engines. Their abilities are matters of fact, amply demonstrated by performance.

Hall-Scott Owners Are More Than Enthusiastic —



"MARATHON"—47 mile Sea Sled. Two 6 cyl. 200 H.P. Hall-Scotts.

Norman De Vaux, Oakland, Calif.—

"I am more than pleased with the pair of six-cylinder 200 H.P. motors installed in my 62 foot cruiser 'Myrno II.' She is really a different craft since making this installation. We are making three to four miles per hour more speed; saved three thousand pounds on engines and reduced the gasoline consumption at least one-third."

Mr. De Vaux has since purchased two additional Hall-Scotts.

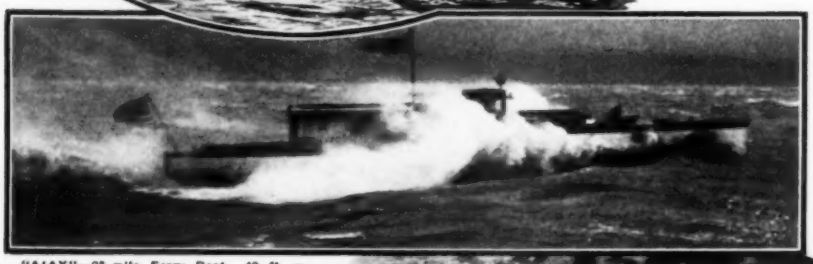
The Sea Sled Company, West Mystic, Conn.—

Regarding the 30-ft. Sea Sled "Marathon."

"These engines have run at least three to four thousand miles since Mr. Plant had the boat, and Capt. Perry is very proud of the way they have behaved and stood up in this service."

John L. Hacker, Naval Architect and Boat Builder—

"After riding behind several of your 'fours' there is no need for a customer insisting on a 'six' to eliminate vibration. Your 'four' does the trick. We recommend your motors for runabouts and fast cruisers because holding down the weight means everything in the success of these types of boats; also your engines have proven they will stand up better and longer than any of the other fast turning motors."



"AJAX"—25-mile Ferry Boat. 40 ft. x 7 ft. 6 in. Six cyl. 200 H.P. Hall-Scott.

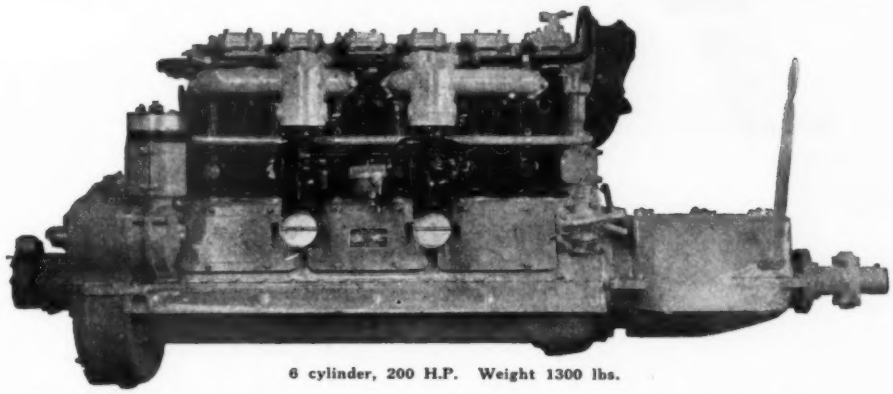
A. Crawford Smith, Jr., Baltimore and Edgewood, Md.—

"I told you I wanted a motor that would go when I wanted to and keep it up until I quit. You said that yours would. So far it's more than made good. All told, I have burned over 800 gallons of gasoline this season and with the exception of a few dirty spark plugs, the motor hasn't had a wrench put on it. No carbon has had to be cleaned out, the valves or valve tappets haven't been touched. My boat is now being hauled out for the winter but the last time she ran, the motor turned up 1840 and maintained it like a chronometer until I throttled to make my landing."

"ADIEU"—42 M.P.H. Fisher Allison Trophy winner at Miami, 1921. Six cyl. 200 H.P. Hall-Scott.

Advertising Index will be found on page 192

MARINE ENGINES



6 cylinder, 200 H.P. Weight 1300 lbs.

RUNABOUT speeds from 20 to 48 miles an hour, cruiser speeds from 15 to 35 miles an hour, in serviceable passenger carrying craft, are every day accomplishments for Hall-Scott Marine Engines.

Experienced boatmen know that such service requires the highest degree of power plant perfection. It is not an accident that Hall-Scott engines meet the test. They are a product of the most capable engineering staff and the largest, best equipped plant devoted to the construction of high grade marine engines.

Write for descriptive catalogs. Single and Twin Screw Plants in Stock at

HALL-SCOTT MOTOR CAR CO., Inc.

Eastern Sales and Service Branch

887 NIAGARA STREET BUFFALO, N. Y.

Factory, Berkeley, Calif.

J. W. Packard, Warren, Ohio, and Lakewood, N. Y.—

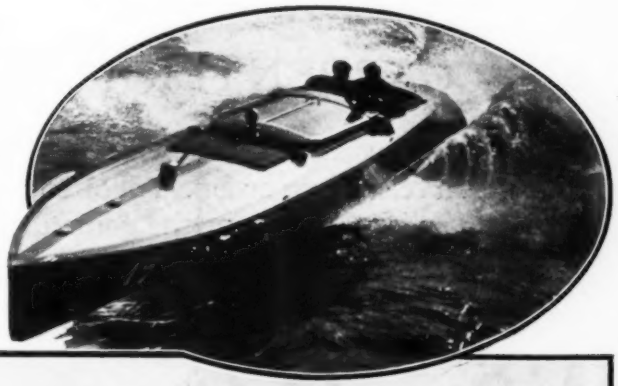
"Our motor is a beautiful piece of work, combining, in my opinion, the advantages of the best airplane and marine practice. "In spite of its light weight, I don't see why you would not be justified in calling your engine a 'Heavy Duty' one; it stands up perfectly—without ever a sign of distress or a request for babying."

Will Ott, President and Gen'l Manager, Segelke & Kohlhaus Mfg. Co. of LaCrosse, Wis.—

"I do not recall that in running approximately 1500 miles there was a single miss in the firing nor a back fire while the engine was idling, or at slow or high speed."

H. N. Slater of New York and Port Washington, Long Island—

"From the start the motor worked beautifully and to date I have driven it more than 600 miles without a miss fire, or any trouble whatsoever. I am extremely well pleased with its operation."



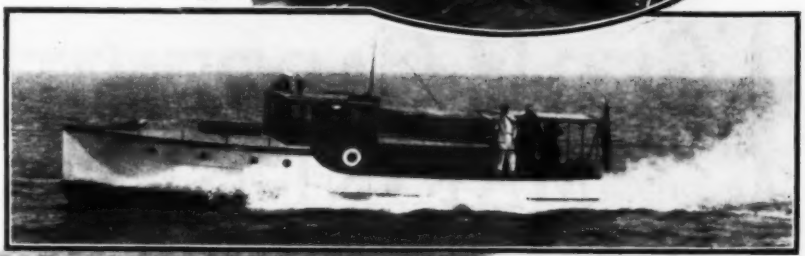
"NICK NACK"—Officially world's fastest displacement runabout powered with a single Marine Engine. 200 H.P. Hall Scott.

Fred E. Holmes, Detroit—

"Your 'six' is the first marine engine that we have had any experience with, that has been able to maintain a speed of 1700 R. P. M. and better all season, without something coming loose."

Isaac Rosenfield, New York and Fort Myers, Fla.—

"We made the trip from Fort Myers to Long Key—Miami, then to Palm Beach without any trouble whatever. I think we averaged, from Long Key to Miami, about twenty-two miles per hour, which was with the large wheel. I think this season I can easily average better than twenty-seven miles per hour." (4-cyl. Hall-Scott in 40 ft. runabout.)



"WINIFRED"—Fastest cruiser on Pacific Coast, 30.9 M.P.H. 43 ft. x 10 ft. Two 6 cyl. 200 H.P. Hall-Scotts.

"DOUGHBOY"—37 M.P.H. 35 ft. x 6 ft. 6 in. 200 H.P. Hall-Scott

A Wider Vision

of the world of Motor Boating; its principles, its development, its wonderful future, may be had by visiting the present Motor Boat Show.

Those who cannot attend will gain some idea of it from the splendid descriptions which will appear in the marine magazines.

These articles will be a great aid to you in laying out your plans for next season with the aid of that indispensable book, the

CARPENTER MARINE CATALOG

The enthusiasm of last season is going to give to the coming one a marvelous expansion. All of the old boat owners and thousands of new ones will boost the game to the best of their ability.

You of course are one of the interested ones. Send for our Marine Catalog; it's free; start planning now.

GEO·B·CARPENTER & CO.

MARINE SUPPLIES

200 W. AUSTIN AVE. CHICAGO

(See our booth at the show)

Advertising Index will be found on page 192

THERE is one Reverse Gear, which, over a period of years, has built up a steadily increasing reputation for "being there in a pinch", for rendering that day-in and day-out dependable service so absolutely necessary.

¶ This Reverse Gear, functioning faultlessly on thousands of boats of many types, has, more than any other single factor, made these boats safe, efficient and reliable.

¶ YOUR boat must be equipt with a dependable gear to be safe.

(*Continued on page* 147)

TOBIN
Resists the corrosive

TOBIN BRONZE is the trade name of a remarkable bronze alloy which combines high tensile strength and toughness with great resistance to salt-water corrosion. It is the most suitable material ever discovered for underwater parts of motor boats and yachts, such as propeller shafts, struts and steady bearings, propellers, rudders, rudder stocks, hull plates, centerboards, fin keels, fastenings, etc.

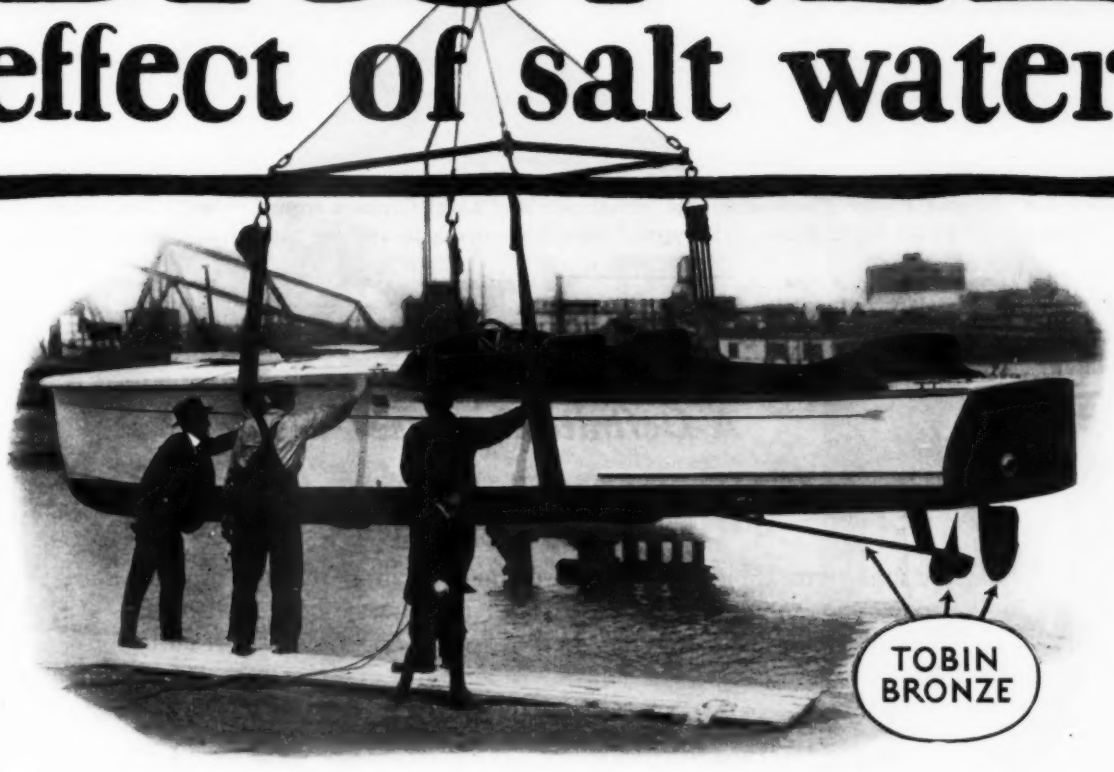
The original formula is still owned exclusively by The American Brass Company, which has been manufacturing this alloy for more than thirty years.

When you specify TOBIN BRONZE, be sure you get TOBIN BRONZE manufactured by The American Brass Company.

Write for descriptive booklet on Tobin Bronze. It summarizes engineering and chemical tests of Tobin Bronze and gives the experiences of well-known boat-builders with the alloy.

Advertising Index will be found on page 192

BRONZE
effect of salt water



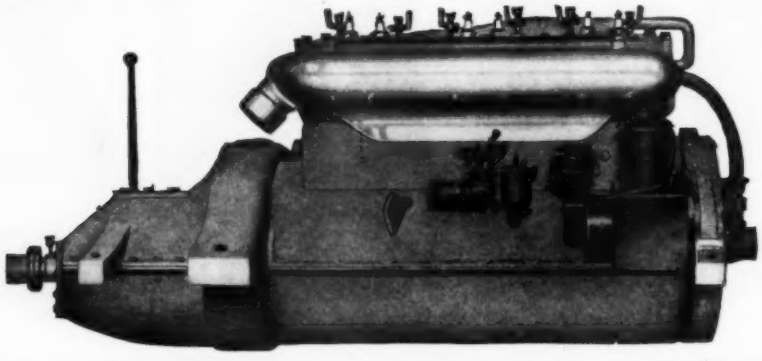
IN boats intended for salt water service, conscientious architects or builders specify Tobin Bronze for the underwater parts. Even though your boat may be used principally in fresh water, it will pay you to utilize genuine Tobin Bronze and thus solve the corrosion problem.

In addition to its strength and toughness, resistance to corrosion and tendency not to foul, Tobin Bronze possesses a high degree of smoothness and uniformity of texture, so that it is easily machined, and takes a beautiful finish. New users for Tobin Bronze are constantly being found.

When you buy an engine or build a boat, be sure the specifications for propeller shaft and underwater parts read, "made of Tobin Bronze manufactured by The American Brass Co."

THE AMERICAN BRASS COMPANY
WATERBURY, CONN., U. S. A.

The Secret of Smooth, Silent, Steady Power



"Ultra-Six" Marine Power Plant—for Fast Runabouts and Light Cruisers from 18 to 35 feet. Bore 3½". Stroke 5". 25-30 H.P. Four cycle type. Compact enough to replace most four-cylinder engines.

SIX *versus* FOUR

A Definite Purpose

TO produce a specially developed power plant filling a specific need brought the ULTRA-SIX into being.

That the quiet, vibrationless operation of the six-cylinder motor provides the logical power for motor boat service is no longer questioned. But owners of Fast Runabouts and Light Cruisers in the 18 to 35 foot sizes have tried to content themselves with the lesser efficiency of the four-cylinder type because of space restrictions.

That is why the ULTRA-SIX was created. It is the last word in Motor engineering for boats of this type, and is *compact* enough to replace most four-cylinder engines.

The price is right because it is built on a quantity production basis, complete in every essential — electric starter, generator, reverse gear, never-failing oiling system, hot-spot manifold, etc.

You will want our catalog. Write today

ULTRA-SIX MARINE MOTOR COMPANY

20 E. Jackson Blvd. Chicago, Ill.

ULTRA-SIX

MARINE POWER PLANT

Advertising Index will be found on page 192

TRADE MARK

THE ORIGINAL ROBERT BOSCH

TRADE MARK

MAGNETOS AND Spark Plugs

TRADE MARK
(ON ALL PRODUCTS)

Are Especially Suited For Use On
MARINE ENGINES

FOR YOUR PROTECTION; *LOOK FOR THIS TRADE MARK*

TRADE MARK

ROBERT BOSCH MAGNETO COMPANY INC.
OTTO HEINS, President
123 West 64th Street, New York, N. Y.
Write for Literature

TRADE MARK

Twelve Hundred Miles at Sea in
The Remarkable Run of Gar Jr. II From Florida to New
Records as Well and Beats the Running Time of a Train
Buffalo, and Detroit, a Total Distance of 2,000 Miles
By C. P. Chapman
COMMODORE GAR WOOD of the Detroit Motor Boat Club on
Gar Wood, owner and skipper of the "Gar Jr. II," which he drove up the coast from Miami, through the Hudson, the Barge Canal and Lake Erie, back to Detroit
express cruiser flying up the Hudson during her recent spectacular cruise from Miami, Florida, to Detroit

MOTOR BOATING

118 WEST 40TH STREET,
NEW YORK

June 27, 1921.

Prentiss-Wabers Stove Company,
73 Spring Street,
Wisconsin Rapids, Wisconsin.

Gentlemen:

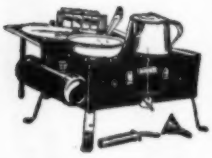
I want to express to you my appreciation for what you have done for the motor boatmen of the country in perfecting your Auto-Kamp-Kook-Stove.

We used one of your outfits on Gar Junior II on our run up the Coast from Miami, Florida, to New York, in which we beat the running time of an express train between these two points. Although it was too rough most of the time while we were at sea to keep ones feet on deck, yet we never missed a meal due to your stove. It worked perfectly in all conditions of weather at sea.

I shall be glad to tell others of our experience with the stove whenever the occasion arises.

Yours very truly,
C. P. Chapman
Editor.

C. P. Chapman-B



Two-Burner Kit—Open, showing Equipment.

Two-Burner Kit — Closed. All Equipment Packed Inside.

Equipment, as shown in illustration, consists of folding aluminum frying pan and cover, coffee pot, condiment container, pump, and funnel. All the equipment packs inside the stove, making it as compact as a suitcase. Has a handle for carrying.

Price, complete with equipment $15.50

Price, without equipment..$13.50

ONE BURNER KIT—OPEN

ONE BURNER KIT—CLOSED

This model is very compact and is ideal for use where space is at a premium, or for one person planning a hunting or fishing trip. It takes up no more room than a camera. Has pressure gauge, pump and funnel.

Price, complete.....$8.50

For Smaller Craft

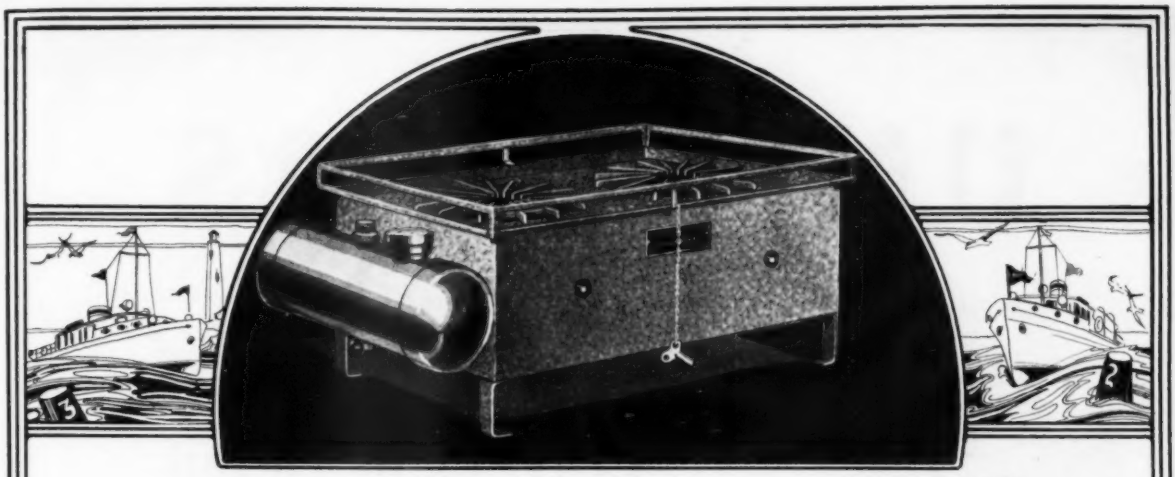
KAMP KOOK KIT

FOR launches, runabouts, and all small craft, Auto-Kamp-Kook-Kit fills the need for a portable stove which is light and compact and can be set up at a moment's notice. Burns motor gasoline, operates the same as Auto-Galley-Kook-Kit. Made in one, two, and three burner models. Auto-Kamp-Kook-Oven enables one to bake and roast meats, etc., perfectly. Folds up flat for carrying.

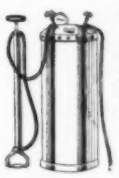
If your dealer doesn't carry Auto-Kamp-Kook-Kits, write direct for full information.

PRENTISS-WABERS STOVE CO., 108 Spring Street, Wisconsin Rapids, Wisconsin

Advertising Index will be found on page 192



The Stove for Your New Boat—



If desired, Auto-Galley-Kook-Kit can be furnished with the tank separate from the stove, and equipped with 15 feet of copper tubing so the tank can be mounted on deck.

Price complete with 3 gal. tank, 10" pump..$32.50

Price complete with 1 gal. tank, small pump $27.50

FOUR-PARTY SUIT CASE OUTFIT

This outfit is ideal for the smaller craft which do not have space for a permanently installed stove. The equipment includes all necessary dishes and utensils for a party of four, as well as a Two Burner Auto-Kamp-Kook-Kit, all packed in a handsome suit case.

Price, complete, for four persons..$42.00
Price, " " six " ..$45.00

TWO-PARTY SUIT CASE OUTFIT

This outfit contains a complete assortment of dishes, and utensils for two persons, and a One Burner Auto-Kamp-Kook-Kit, packed in a handsome suit case.

Price, complete.....$25.00

GALLEY Auto KOOK KIT

TRADE MARK

EFFICIENT—practical—built especially for marine use—occupies minimum space—made of the very best materials obtainable—economical to operate—perfectly safe under all conditions.

SPECIFICATIONS:

Size, 20¼" x 10½" x 5⅛"; legs 2" high; body made of galvanized iron, strongly riveted; all fittings galvanized or of copper or brass; tank made of brass, carefully tested; has rail around top to prevent utensils from sliding off. Burns ordinary motor gasoline—gives a steady hot blue flame that a thirty mile wind will not blow out. Equipped with a full sheet of galvanized iron for covering of table or bench on which stove is mounted. Has slots for legs to fit into. Pump and funnel with each stove. Price complete.....$20.00

If your dealer or jobber does not have Auto-Galley-Kook-Kit, write direct for complete information.

PRENTISS-WABERS STOVE CO.

General Offices and Factory:
108 Spring Street
Wisconsin Rapids, Wisconsin

You can see Auto-Galley-Kook-Kit on exhibit at The Motor Boat Show, New York City, February 17th to 25th. Booths 83, 85, 87, 89, on the Mezzanine floor.

UNIFORMS

ESTABLISHED 1857

Correct in Detail
Finest in Quality

YOU are invited to visit our exhibit Space 41 at the Motor Boat Show, Grand Central Palace. Here you will find all clothing necessary for the yacht club member, boat owner, captain or crew. If you cannot attend the show, visit us at our headquarters at any time.

From a cap for the club member to the full equipment for the officers and crew of the largest yacht we can fill your every requirement with promptness, satisfaction and economy.

Our new booklet is now ready for distribution and we will be pleased to send you your copy.

B. SCHELLENBERG & SONS

99 to 105 Myrtle Avenue **Brooklyn, N. Y.**

(Near Bridge Street)

Telephone: Main 804

Advertising Index will be found on page 192

Something Else—as Good as

RAJAH SPARK PLUGS

YOU probably know how good Rajah Spark Plugs are,—the favorite marine plugs for more than 20 years. Well, here is something else in the same class, the Rajah Terminal that adds the finishing touch of convenience, appearance and efficiency to your engine. Rajah Terminals are regularly used by most of the leading motor builders in all automotive fields. Now we offer you a brand new type designed especially for the motor owner.

RAJAH SOLDERLESS TERMINALS

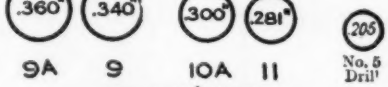
(Actual size)

Thrust Clip | Hook Clip | Ring Primary | Assembly to Cable

The biggest little thing you can do to your boat this spring is to equip all your spark plug wires with Rajah Solderless Terminals. You can do it in a few minutes, without solder or tools. It will cost you less than a dollar, and you'll never stop congratulating yourself on the investment.

To attach terminal to cable you simply strip insulation back 3/16", insert wire in ferrule and screw down the pointed part as shown. It can't shake loose or come apart but you can detach it instantly. Rajah Terminals fit on any spark plug.

If your dealer hasn't stocked this terminal yet, send us his name with 15 cents for a sample. Or order enough to equip all your spark plug wires, stating sizes and types wanted.



Standard Cable Sizes:

5 M.M., 196 | 7 M.M., 275 | 9 MM., 354

Waterproof Rajah Plug
Waterproof
Shockproof
Breakproof

Made especially for exposed Marine Motors
Price $1.25
All Threads

Don't start the season without a full set of Rajah Spark Plugs

This will insure you against loss of time, spark plug trouble and expense for the rest of the year, perhaps for several years. Rajah users tell us of five to seven years' service from one set of plugs. Hundreds of boatmen will use no other. Countless races stand to their credit. They are the most dependable spark plugs it is possible to manufacture.

Take your choice—there is a plug especially suited for every make of motor. If your dealer does not sell genuine Rajah plugs, write us.

Giant Rajah Plug $1.25 All Threads

Standard Rajah Plug $1.00 All Threads

Waterproof Rajah Plug $1.25. Giant Rajah Plug $1.25. Standard Rajah Plug $1.00

These are the celebrated standard Rajah Terminals

Thumb Nut — with all Rajah plugs unless Ball or Stud type preferred
10c each

Regular
Fits any size cable
10c each

Thrust
10c each

Hook
10c each

Primary
7c each

Furnished with ferrules to fit any size cable

Keeps connections dry
Protects against shocks
Fits any plug or coil
15c each

Manufactured by Rajah Auto Supply Co., Bloomfield, N. J., U. S. A.

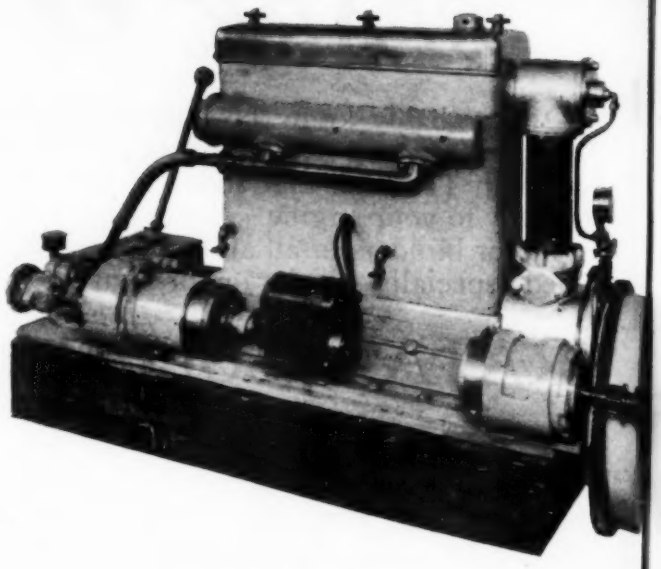
BUY AN ENGINE WITH THE OLD RELIABLE

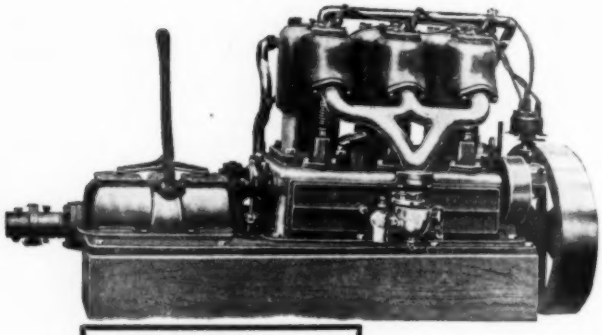
The Old Reliable Palmers with a few of the new ones.

HEAVY duty, medium duty or high speed, we have a motor to give you entire satisfaction for every requirement.

For a generation we have supplied motors to the fisherman, work boat and the pleasure boat owner.

See our exhibit in Space C, Motor Boat Show.





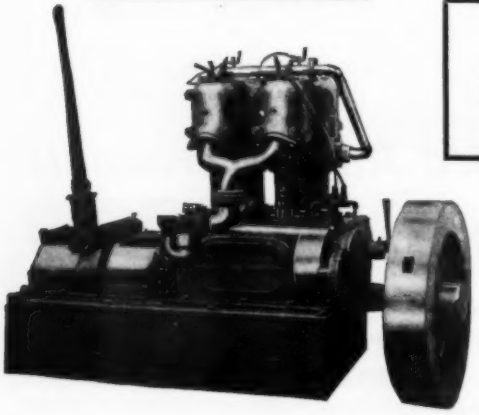
Model N R 3
15-18 H.P.
Bore 5″ Stroke 6″
Price as shown, $600

Model V H—14-16 H.P.

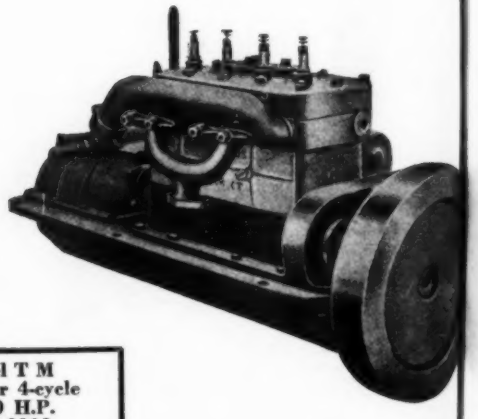
Four-cylinder, four-cycle, high speed overhead cam and valves.

Cylinders cast en Bloc. Equipped with Starter, Generator, Battery, Jump Spark Ignition, High Tension Magneto.

Price, $700



Model F 2
16 H.P.
Heavy Duty
Two-cylinder four-cycle
Price, $900



Model T M
4-cylinder 4-cycle
8-10 H.P.
Price $300

Advertising Index will be found on page 192

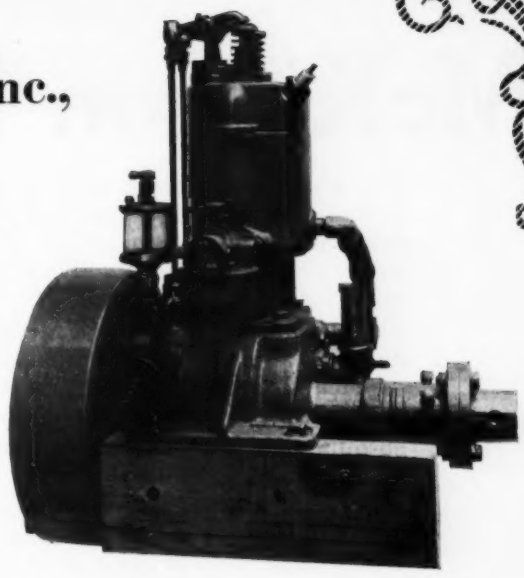
A REPUTATION
PALMER

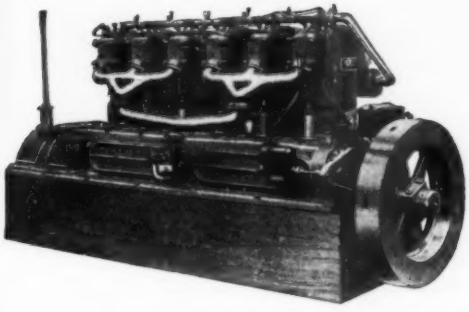
Call or write to our nearest dealer or we will be glad to send you information from our main office.

Palmer Bros., Engines, Inc.,
Cos Cob, Conn., U. S. A.

BRANCHES AND DISTRIBUTORS

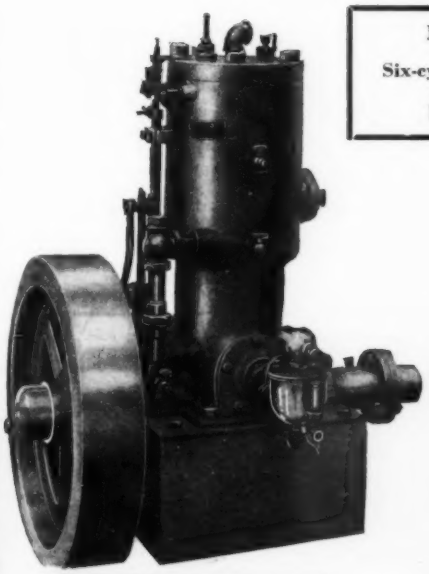
New York, 128 Lexington Ave., between 28th and 29th Streets
Baltimore, 514 E. Pratt St.
Philadelphia, 9 N. 6th St.
Portland, Maine, Portland Pier
Jacksonville, Fla., 122 So. Ocean Street
Boston, Mass. Rapp-Huckins Co., 59 Haverhill St.
Norfolk, Va., Gas Engine & Boat Corp.
Vancouver, B. C., V. M. Dafoe



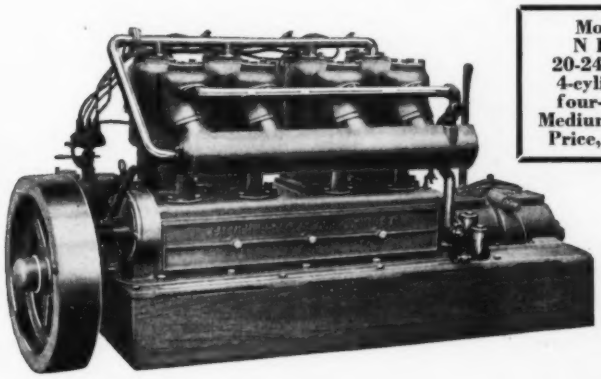


Model Y T
Single cylinder, four-cycle, valve in head. Designed to meet the demand for a high grade yacht tender or small boat engine. Weight 95 lbs. Horsepower, 2.
Price $125

Model N K 6
75-80 H.P.
Six-cylinder four-cycle
Heavy Duty
Price, $3600



Model C
Two-cycle 4 H.P.
Price, $120



Model
N R 4
20-24 H.P.
4-cylinder
four-cycle
Medium Duty
Price, $775

When writing to advertisers please mention MOTOR BOATING, *the National Magazine of Motor Boating, 119 West 40th Street, New York*

For Powerful Engines, Heavy Boats,
Constant Service, Dependability

Your motor is no better than its reverse gear. Of what use is power if you can't apply it? The reverse gear is a vital part of your boat, a part to select as carefully as your engine. Don't buy any old gear you happen to run across.

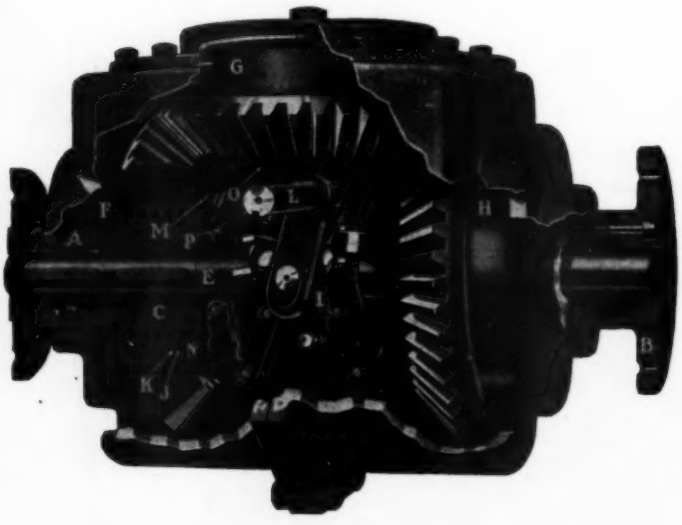
McKinnon Reverse Gear

The McKinnon Reverse Gear was developed solely because we were unable to find a good enough gear in the open market to meet the service requirements of our own commercial boat. Gear after gear was tried,—day after day was lost for repairs and overhauling,—and we needed our boat day and night for delivery purposes.

So we decided to build a gear after our own ideas. Large experience in building automotive transmission parts gave us a comprehensive view of the problem. Thus the McKinnon Reverse Gear was born.

During three years of constant service the first McKinnon Gears required absolutely no repairs or overhauling,—not even an adjustment. Other boatmen asked us to build as good reverse gears for them. The gears sold themselves.

The success and efficiency of the McKinnon Gear is a demonstrated fact. It has made good in the most severe boating service. Furthermore we subjected the McKinnon Gear to a rigid test on the electric dynamometer at the Case School of Applied Science.



Ashtabula Harbor, Ohio, January 13th, 1921.
The McKinnon Iron Works Company,
Ashtabula, Ohio.
Gentlemen:

After watching results of clutch which you had in your boat for a year, I requested you to make up one for mine.

My clutch was installed in a boat which I use for electric welding and is in use during the winter months more than summer. After ice six inches thick has been broken up by harbor tugs, I go any place and have never had any trouble of any kind with my clutch or propeller, due to the fact that the clutch will slip enough to take up the sudden jar on the shaft. While operating my generator I can throw clutch into neutral and run engine for ten hours at a time without injuring clutch and at the same time reduce the load on the engine from the clutch to practically nothing.

Although this clutch has been put to the most severe tests during the past two years, I have never spent one cent on it except for oil—in fact I have never made an adjustment of any kind. I feel perfectly safe in saying that your clutch would outlast and give better satisfaction while in use than all the rest of the clutches put together, and I speak from experience dating from the time gas engines were first used in motor boats.

Yours truly
GEARY BOILER WORKS
Per Frank Geary.

Let us tell you the full details about the McKinnon Gear. Give us the data on your engine, including R. P. M.

Four Sizes Ready for Delivery

No. 1 transmits 4 H.P. per 100 R.P.M.
No. 2 transmits 8 H.P. per 100 R.P.M.
No. 3 transmits 13 H.P. per 100 R.P.M.
No. 4 transmits 20 H.P. per 100 R.P.M.

Other sizes in construction
Absolutely Guaranteed for One Year

McKINNON IRON WORKS COMPANY

Established 1880

ASHTABULA **OHIO**

Advertising Index will be found on page 192

The STANDARD ENGINE'S Lead

First to Bring Out and Standardize—

Life Saving and Police Patrol Boat No. 1 of Toronto Harbor Commissioners, Toronto, Ont., Can. Powered by a 20-24 H.P. Standard Engine

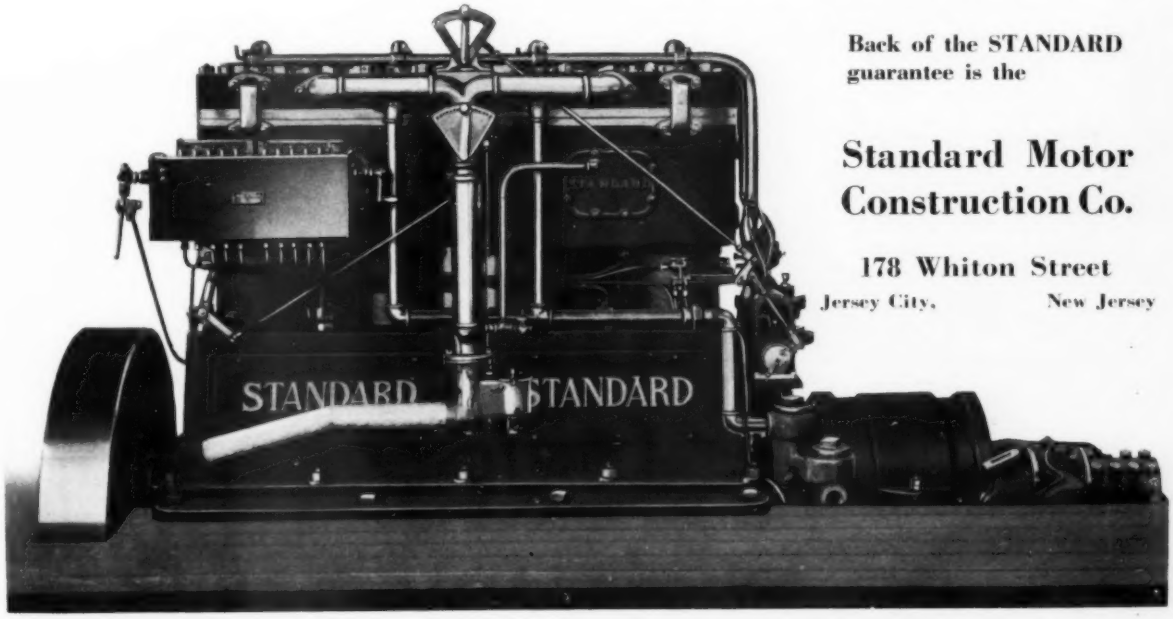
Positive governor control
Positive double ignition
Positive feed lubrication
Positive adjustable reverse gears
Positive plunger pumps
Positive constant level carburetor
Adjustable bronze bearings
Adjustable intermediate gears
Valve in head type
Separate cylinder heads
Direct thrust valve lifters
And many other features that have finally been adopted by automotive engineers.

Every fundamental principle of STANDARD design and construction has been proven right by scientific and service test.

Never has the lead of STANDARD development been so great as today. Never has the STANDARD guarantee meant so much.

STANDARD engines are regularly equipped with either the STANDARD double low tension make and break or the STANDARD double high tension jump spark ignition.

The latest catalogue shows latest features.



Back of the STANDARD guarantee is the

Standard Motor Construction Co.

178 Whiton Street
Jersey City, New Jersey

"Silver Heels II," owned by A. A. Schantz, ex-commodore Detroit Yacht Club. 63′ long, 12′ 3″ beam. Powered by a 70-90 H.P. 6 cylinder 6½″ x 8″ Standard Engine.

Standard Engine Values

DEMAND reflects worth. Present demands for STANDARD engines prove their worth beyond comparison.

Always the cheapest engine in first cost, never before has so much been given to the STANDARD buyer for so little.

At pre-war prices, you get the 1922 model STANDARD engine with its developments and with the regular complete STANDARD outfit and now besides, a very complete STANDARD set of spare parts, regularly furnished.

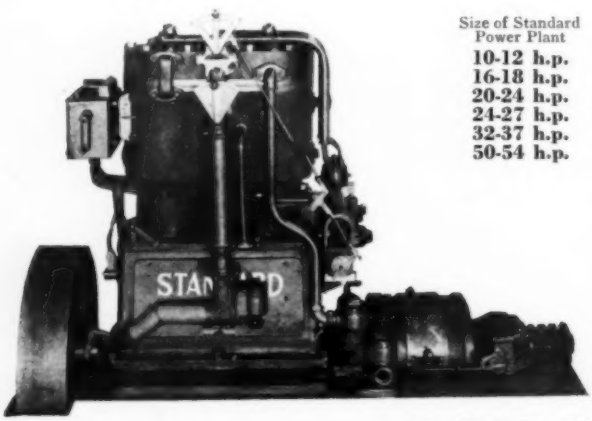
You get an engine such as has been run the equivalent to a year's ordinary work without so much as touching a spark plug.

The self-service of the STANDARD engine, its service without continual outside help, is world renowned.

Buy enduring satisfaction.

The driving power of the STANDARD engine, due to its greater thermal efficiency, greater mechanical efficiency and greater propeller efficiency, is shown by the average size of boats the different size STANDARD engines drive.

The general design, beam, displacement cause some variation in size of engine required for certain conditions, but the table gives a fair average for heavy full bodied boats.



Size of Standard Power Plant		Average Length of Boat	Size of Standard Power Plant		Average Length of Boat
10-12 h.p.	=	25 to 35′	50-60 h.p.	=	60 to 65′
16-18 h.p.	=	30 to 40′	65-75 h.p.	=	65 to 75′
20-24 h.p.	=	35 to 40′	70-90 h.p.	=	70 to 75′
24-27 h.p.	=	40 to 50′	90-100 h.p.	=	75 to 100′
32-37 h.p.	=	50 to 60′	125-150 h.p.	=	100 to 125′
50-54 h.p.	=	55 to 65′			

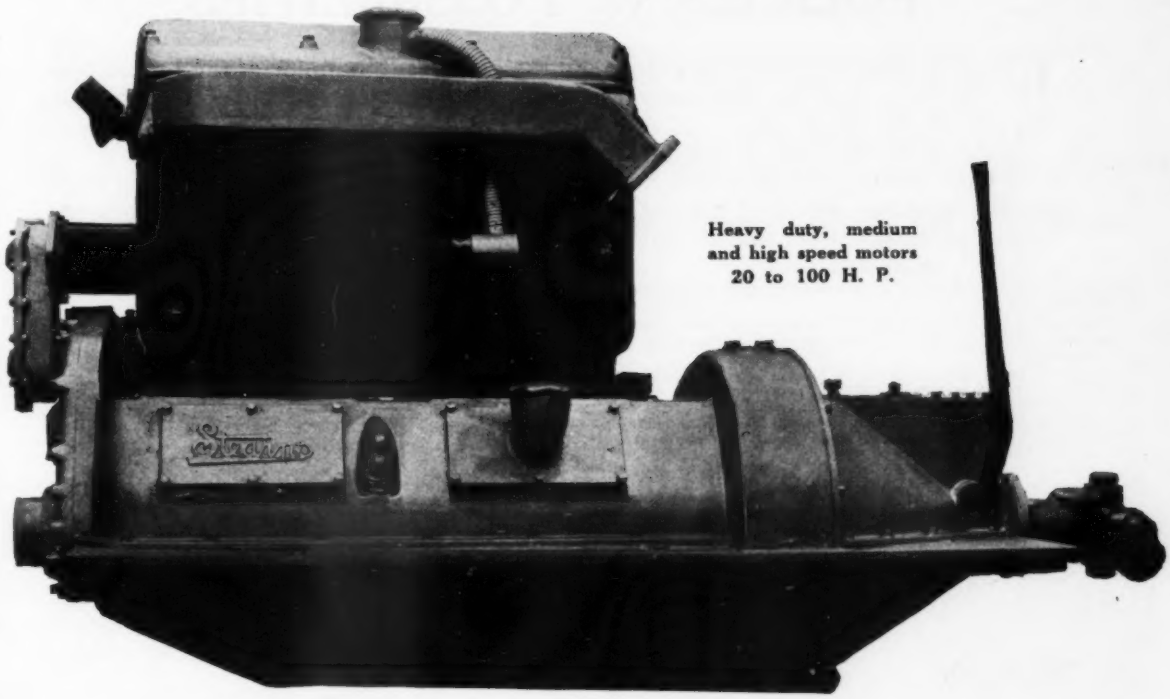
Back of the STANDARD guarantee is the

Standard Motor Construction Co.

178 Whiton Street Jersey City, N. J.

Advertising Index will be found on page 192

Stearns EXTRA RESERVE MARINE MOTORS



Heavy duty, medium and high speed motors 20 to 100 H. P.

BETTER MOTORS—LOWER PRICES

STEARNS Extra Reserve Motors have brought a new standard of value and efficiency to the marine motor market. Their prices are the lowest ever quoted for high grade marine engines.

In fact we want you to know how well they are built before we even tell you how little they cost.

Stearns engineering has given these motors the inherent qualities necessary for reliability and endurance in high duty service. Stearns manufacturing facilities have given the buyer the great advantages in economy and efficiency procured by modern multiple production, without sacrificing quality or workmanship.

STEARNS MOTOR MANUFACTURING COMPANY

LUDINGTON, MICH.

Stearns EXTRA RESERVE MARINE MOTORS

POLICIES vs. POSSIBILITIES

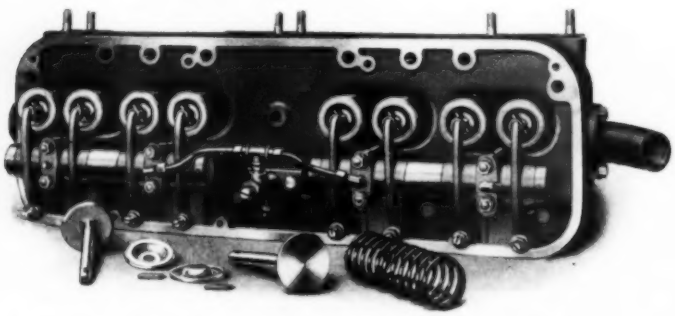
EVERY manufacturer tries to turn out the best possible motor at the lowest possible cost,—just the same as every dealer, boat builder and buyer tries to buy the best at the lowest cost.

But it is one thing to try, and another thing to succeed.

Our success in making the Stearns such an exceedingly good motor at such exceedingly low prices is the logical result of several important advantages not possessed by any other marine motor builder.

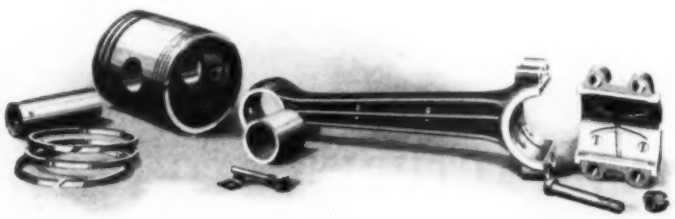
For Example:

1. **Unlimited financial resources to provide the best manufacturing equipment.**
2. **A definite policy of producing the best, regardless of capital expense.**
3. **A plant equipped with $600,000 worth of the finest machine tools and patterns.**
4. **Practically all parts of Stearns Marine Motors interchangeable with parts of our other industrial motors, permitting real quantity production at lowest unit cost.**
5. **We employ every facility and every instrument known to engineering science to test the accuracy, uniformity and performance of each part of each motor before shipment.**

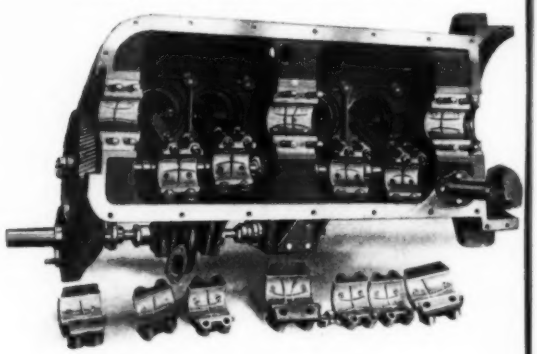


All Stearns motors have overhead valves and detachable cylinder heads. This is the only overhead valve system which permits adequate water jackets for cooling the valves. The entire valve mechanism is removed with the cylinder head, making valve grinding simple, quick and easy. Unusually large rocker arm bearings, lubricated under pressure, insure permanent quietness.

Accessibility is one of the big features of Stearns Motors. Large hand hole plates are provided for minor adjustments and inspection.



The Stearns crankshaft is chrome nickel steel, heat treated, with bearings ground and lapped to size. The shaft is accurately balanced on a Norton crankshaft balancing machine. Bearings are bronze backed, with high grade babbit lining. Stearns Motors have the largest crankshaft and connecting rod bearings of any motors of their size and power.



The connecting rod is carbon steel, heat treated. The cap is held in place with four ½" chrome vanadium steel heat treated bolts and special extra long nuts. The wrist pin end holds a bronze bushing. The piston has three piston rings, the lower one acting as an oil ring. The wrist pin is made of carbon steel, case hardened and ground accurately to size.

Advertising Index will be found on page 192

A GENUINE MARINE MOTOR FOR HEAVY SERVICE

THE Stearns is a real marine motor, designed for heavy duty, medium or high speed service. It has made good in both pleasure and work boats. It is built for efficiency and endurance. It is a tried and proven design, the success of which has been demonstrated by hundreds of Stearns motors over a period of three years.

When we ship a Stearns Motor it is ready for immediate service. No tight bearings or careful running in. Our double test and inspection methods mean satisfaction from the first.

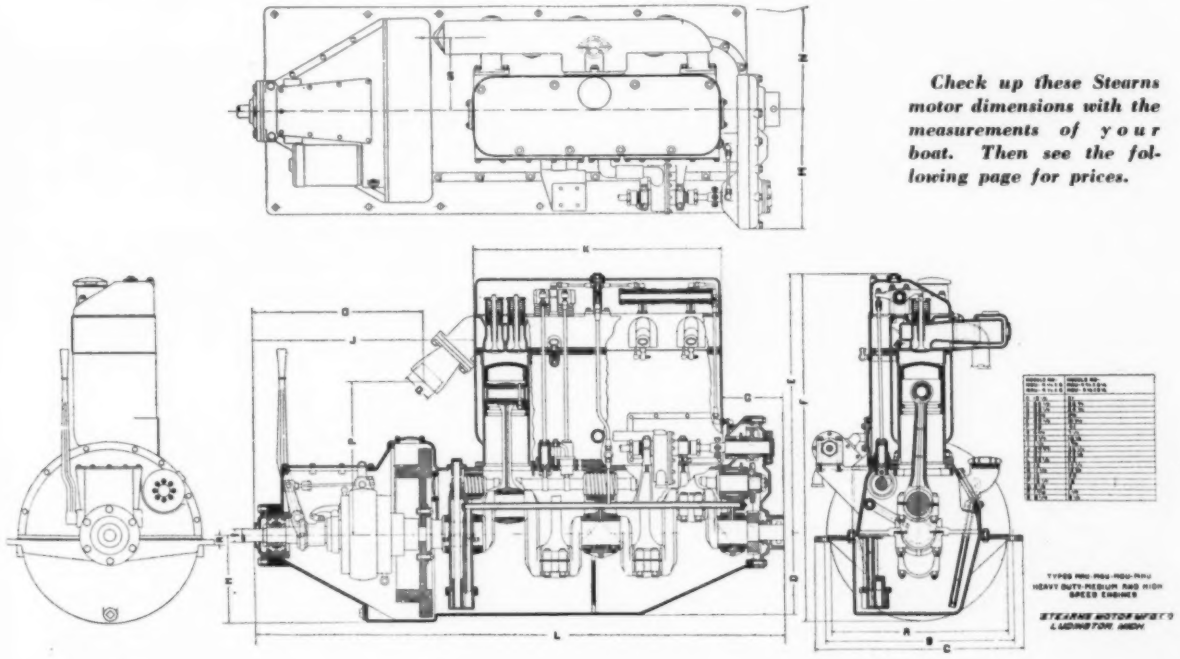
Good Engineering and Careful Workmanship Insure Steady Service and Simple Maintenance for Stearns Owners

Every part of the Stearns motor is manufactured absolutely to a standard within unusually close limits. When first assembled each motor is tuned up to develop its rated power on the Sprague electric dynamometer. Then the motor is torn down, readjusted, reassembled and given a final dynamometer test before shipment.

These tests are the equivalent of several weeks of service and tuning up by an expert marine engineer.

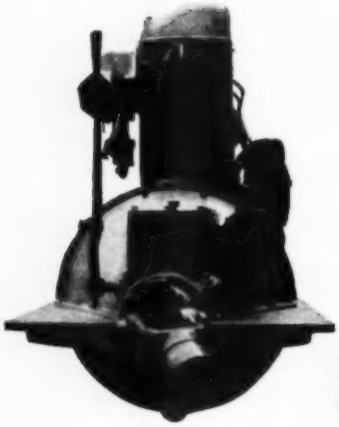
The Stearns lubricating system is one of the most important features of Stearns motors. It is a positive internal pressure feed system, with 5 lbs. to 50 lbs. pressure at various points, reaching every moving part. This insures a plentiful supply of oil at the right place and the right time, as long as the motor is in operation.

Oil under pressure through drilled crankshaft to all bearings, through steel tubes to all wrist pins, to the overhead rocker shaft, etc.



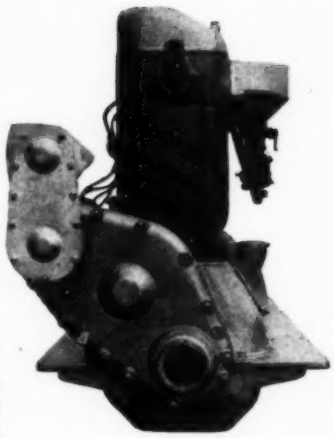
Check up these Stearns motor dimensions with the measurements of your boat. Then see the following page for prices.

Stearns EXTRA RESERVE MARINE MOTORS



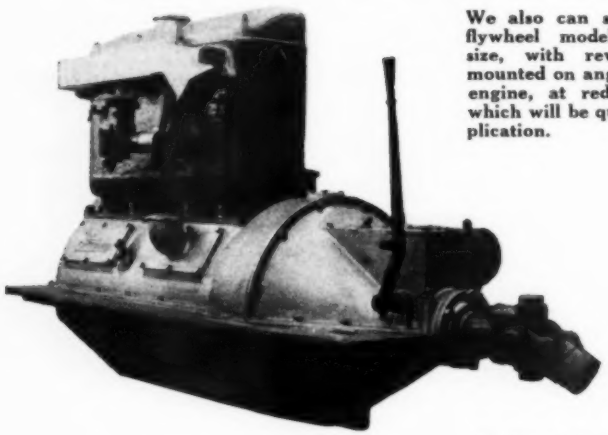
YOU'LL like the Stearns motor, its handsome clean cut appearance, its quality of design and construction, its admirable service qualities and its low cost,—first cost, fuel cost and maintenance cost.

Stearns Motors will stand up to the hardest kind of work at any point in the range of R. P. M. stated below. They are therefore suitable for any type of pleasure or work boats, from the speedy runabout to the heavy cruiser or commercial boat.

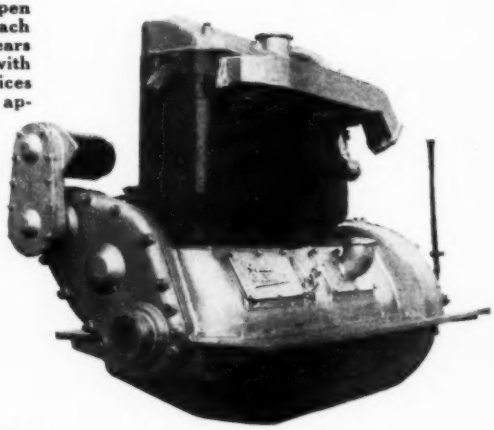


The following Stearns Motors are completely enclosed Unit Power Plants

Model MGU 4¼ x 6 "	20 HP at 500 to	45 HP at 1200,	$ 950.00
Model MHU 4½ x 6 "	25 HP at 500 to	50 HP at 1200,	1000.00
Model MAU 4¾ x 6½"	28 HP at 500 to	50 HP at 950,	1075.00
Model MDU 5⅛ x 6½"	35 HP at 550 to	60 HP at 950,	1200.00
Model MHR spec. high speed		65 HP at 1600,	1100.00
Model MDR spec. high speed		100 HP at 1600,	1300.00



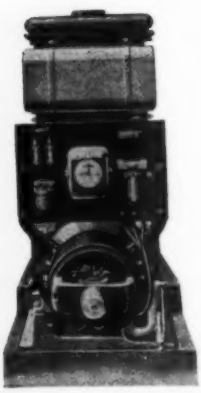
We also can supply open flywheel models in each size, with reverse gears mounted on angle sills with engine, at reduced prices which will be quoted on application.



Write Today for Catalog

STEARNS MOTOR MANUFACTURING COMPANY

LUDINGTON, MICH., U. S. A.



DISTRIBUTORS

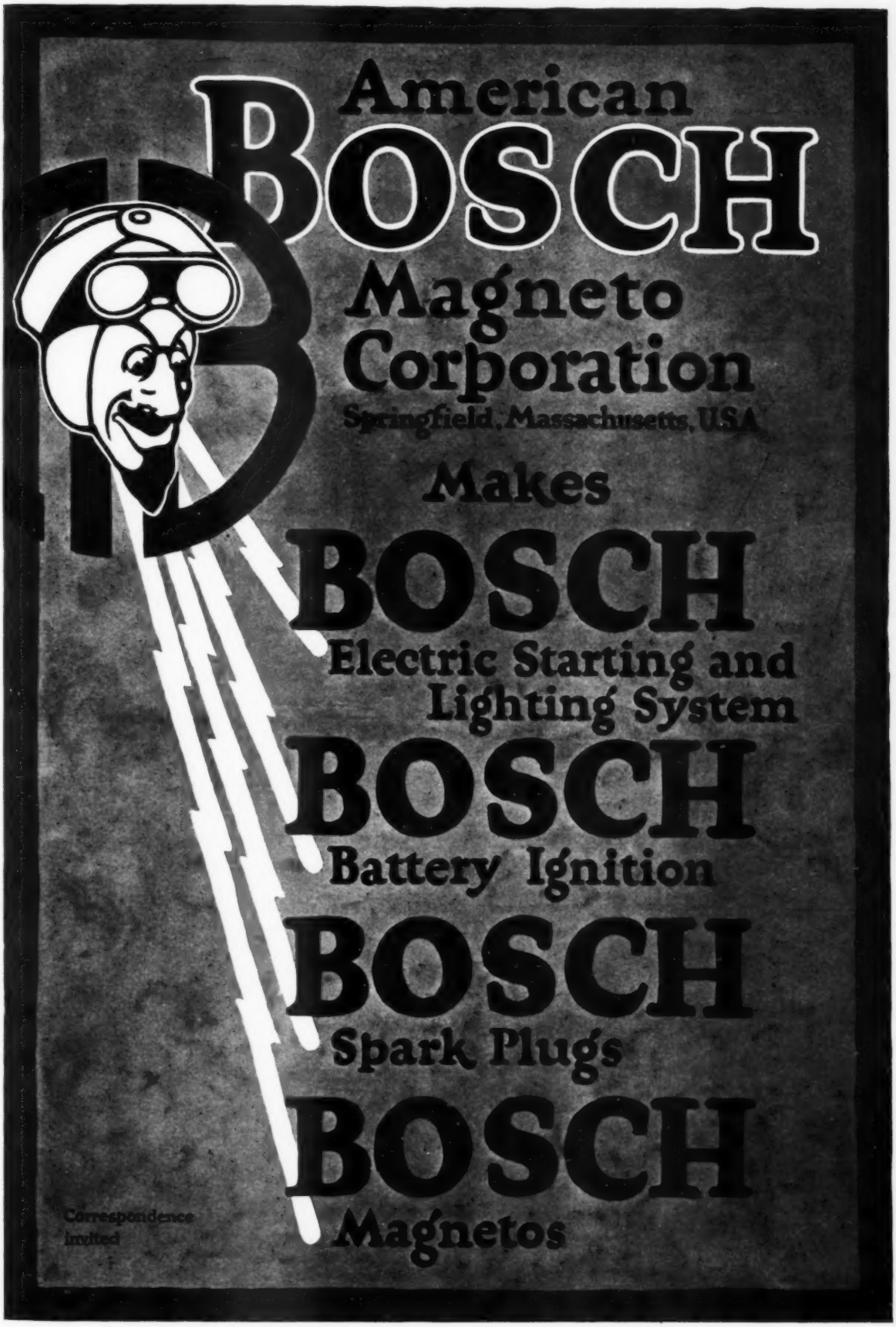
Bowler, Holmes & Hecker Co., Inc., 259 Greenwich St., New York City.
Central Marine Service Corp., 708-709 Vinton Bldg., Detroit, Mich.
W. L. Masters & Co., 229-231 N. State St., Chicago, Ill.
Walter Dean Canoe & Boat Co., Toronto, Ont., Canada

The Stearns Lighting Plant for Boats

Stearns Lighting Plants, like Stearns Marine Motors, possess the advantages of quality and low cost. Built of the best throughout, designed by experts. Water cooled.

32 volt, ¾ K.W. capacity ***Write for catalog and prices***

Advertising Index will be found on page 192


American
BOSCH
Magneto
Corporation
Springfield, Massachusetts, U.S.A.
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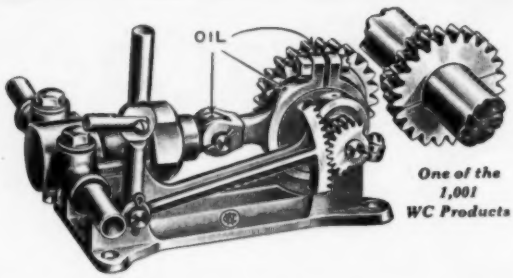
BOSCH
Electric Starting and
Lighting System
BOSCH
Battery Ignition
BOSCH
Spark Plugs
BOSCH
Magnetos
Correspondence
invited

TRADE MARK



One of the 1,001 WC Products

The "Driboat" Bilge Pump

A gear-driven pump that can be thrown in or out of action without slowing the engine. Can be placed on port or starboard side of shaft, as desired, and operated from deck by extending the vertical lever with a piece of pipe or with connecting rods and bell cranks. Made entirely of brass, with the exception of cam and cam shaft, and provision is made for oiling these, which will prevent rusting. Capacity, six quarts a minute at 530 r.p.m.

The pump is of simple construction. Base dimensions, 4" x 8"; space required, 4½" x 9½"; weight, 11 lbs. Spur gear may be bored for ¾" to 1½" shafts.

At your dealer's, or write us. Look for the WC Trade Mark.

Get This Book of Helpful Hints for Motor Boaters

"Sea Craft Suggestions and Supplies" solves those daily "puzzlers" that few know how to handle. Tells how to Box the Compass; what is Proper Ground Tackle; gives hints on Steering gear, etc.; describes WC Dependable Marine Hardware; tells uses. Compiled from 75 years' experience in making marine fittings. 50c prepaid.

WILCOX, CRITTENDEN & CO., Inc. (Est.1847)

4 South Main St., Middletown, Conn.

Visit Space 108 at the New York Motor Boat Show

MAXIM SILENCER

Advertising Index will be found on page 192

TRADE MARK

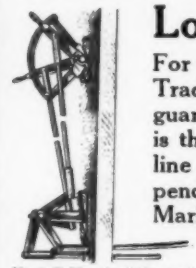
WC Spark and Throttle Controls

One of the 1,001 WC Products

No. 1-F Vertical Control and No. 0-C Control Cranks

Perfect One Man Control From Any Part of Your Boat

THE WC line of Spark and Throttle Controls covers every possible combination necessary for one man control of the engine. Vertical, Bulkhead and Horizontal types; made of special bronze, highly polished, with single or double levers. Controls respond to slightest change of levers; notches in segment prevent accidental shifting. Easy to install. At your dealer's, or write us.



No.1-E Vertical Control
No.0-B Control Cranks

Look for the WC Mark

For three-quarters of a century the WC Trade Mark has been to boat owners a guarantee of good Marine Hardware. It is the mark by which you can identify a line of boat fittings famous for its Dependability. When you insist on WC Marine Hardware, you make certain of getting 100 cents' worth of service for every dollar you pay.

Get This Book of Helpful Hints for Motor Boaters

"Sea Craft Suggestions and Supplies" solves those daily "puzzlers" that few know how to handle. Tells how to Box the Compass; what is Proper Ground Tackle; gives hints on Steering Gear, etc.; describes WC Dependable Marine Hardware; tells uses. Compiled from 75 years' experience in making marine fittings. **50c prepaid.**

WILCOX, CRITTENDEN & CO., Inc. (Est. 1847)
4 South Main St., Middletown, Conn.

Visit Space 108 at the New York Motor Boat Show

MAXIM SILENCER

"Whippet," Oliver G. Jennings, owner. Two 400 H.P. Murray & Tregurtha motors with Tvedt Adjustable Mufflers.

Speed and Power with

SILENCE

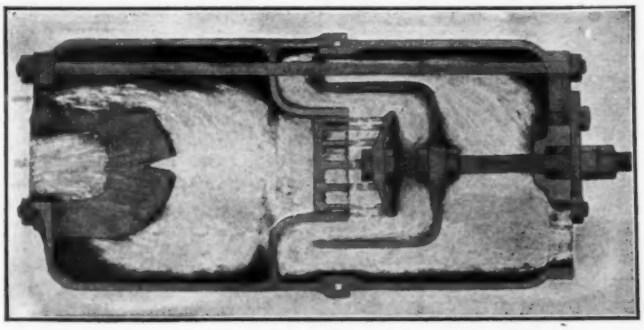
Owners and builders of marine engines, large and small, know that it is a difficult problem to effectually silence the exhaust without creating a harmful back pressure on the engine. Back pressure decreases speed and power, overheats the valves and causes an unnecessary strain on the entire engine.

TVEDT ADJUSTABLE MUFFLER

THE Tvedt Adjustable Muffler is a completely successful silencer which has demonstrated its efficiency in several seasons of marine service. It has been installed on some of the finest and highest powered motor yachts built in recent years.

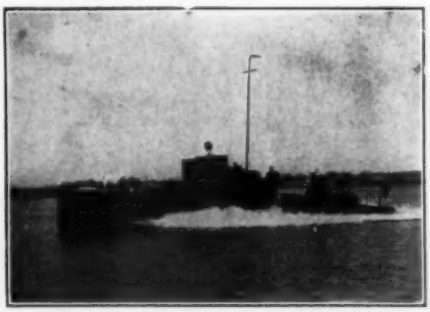
An important and exclusive advantage of The Tvedt Muffler is its adjustable feature which permits the owner or engineer to adjust it exactly to the requirements of the engine after the muffler is installed and while the engine is in actual operation.

Experience has demonstrated that different engines of the same size, power or cylinder dimensions will vary considerably in their muffler requirements. Therefore a stock size muffler can only approximately fit a certain engine. The Tvedt Adjustable Muffler is the only one which meets this condition.



The Tvedt Adjustable Muffler insures the highest degree of silence in the exhaust, and the highest degree of efficiency in the engine. It is designed to expand and cool the hot exhaust gases gradually so that the noise is silenced without causing any back pressure.

Built in sizes from 1½" to 5" exhaust connections.



"Uncas," Prof. Chas. Lane Poor, owner. Two 400 H.P. Duesenberg motors with Tvedt Adjustable Mufflers.

Let our Engineering Department recommend the proper size muffler for your engine. Tell us the bore, stroke, number of cylinders and make of your motor.

Write today for catalog and prices

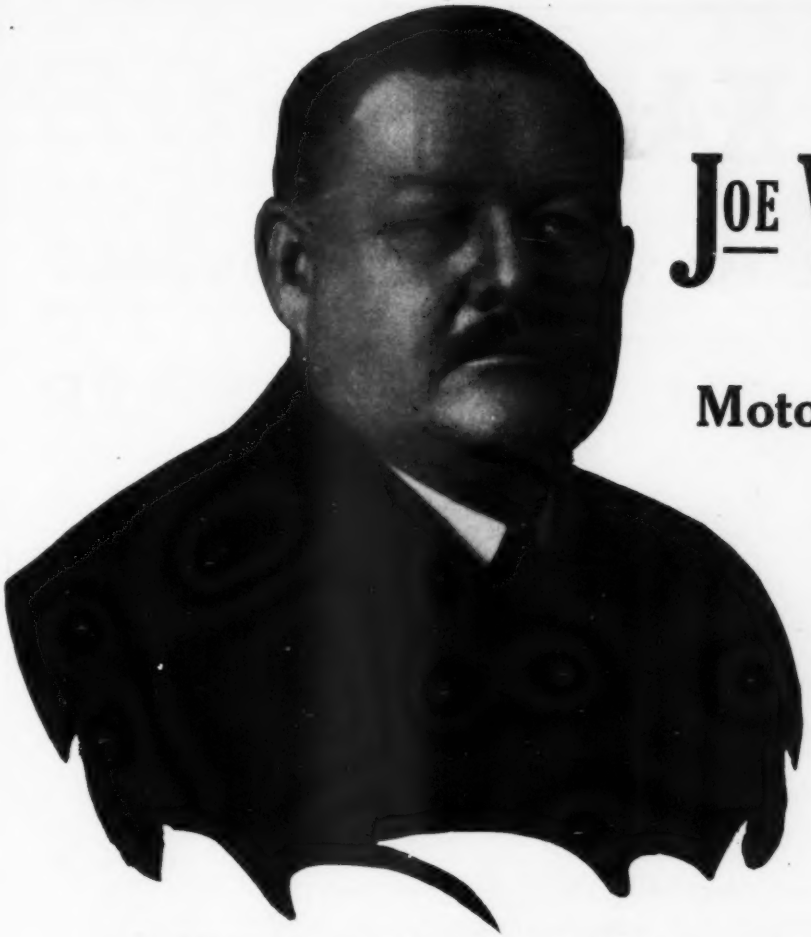
One of six Russian Patrol Boats, each equipped with three 400 H.P. Duesenberg motors with Tvedt Adjustable Mufflers.

TVEDT-SMITH COMPANY

WORCESTER, MASS. **NEW YORK OFFICE, 103 FRANKLIN ST.**

Also manufacturers of the Tvedt Adjustable Tiller Quadrant.

Advertising Index will be found on page 192



Meet

JOE VAN BLERCK

AT THE

Motor Boat Show

February 17th to 25th

GRAND CENTRAL PALACE
NEW YORK

J. V. B. EXHIBIT
at Space F2

MR. JOSEPH VAN BLERCK in person will be in charge of the J. V. B. engine exhibit throughout the Motor Boat Show in New York.

Let this veteran marine engine designer explain to you in his own words some of the new improvements in the 1922 J. V. B., his latest and best engine.

We invite you to come and examine the engine yourself, ask all the questions you wish and put it up to Mr. Van Blerck to give you the benefit of his vast experience for solving your marine power problems.

Two years of general use in all types of boats, both pleasure and commercial, have simply served to prove the remarkable qualities of J. V. B. engines. Construction which seemed almost radical at first has demonstrated its advantages in actual service.

The 1922 J. V. B. is a still better engine. For example we offer a new kerosene burning outfit that is not a makeshift but which will actually start and run the engine on this cheap fuel with the same satisfaction you get from gasoline.

If you are unable to get to the Show, don't fail to write to the factory for latest catalog and specifications. If you have any special questions to ask, Mr. Van Blerck will be glad to answer them by letter. Write today.

THE J. V. B. ENGINE COMPANY

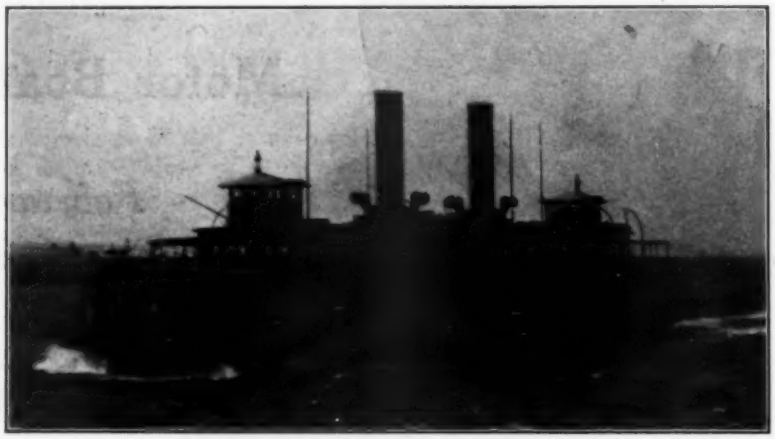
196 Kenmore Blvd. **Akron, O.**

K-A-U-R-I

TRADE MARK

Pronounced "Cow-Rie"

AND THE STATEN ISLAND-NEW YORK FERRY BOATS



Varnished with K-A-U-R-I Waterproof
Spar Varnish

These boats, operated by the City of New York, are subjected to ice and snow, broiling sun, rain, winds and salt water, night and day the year around.

Only K-A-U-R-I Waterproof Varnish could withstand such severe exposure!

Absolutely waterproof — very durable and dries hard over night.

We also manufacture Floor and Porch Enamels, Varnish Stains, and White Enamels.

If you are unable to buy K-A-U-R-I from your dealer, write to us direct.

Send for FREE SAMPLE and circular, "HOW TO REFINISH YOUR BOAT."

BROOKLYN VARNISH MFG. CO.

BROOKLYN, NEW YORK

Advertising Index will be found on page 192

"More Than a Million a Month"

QUALITY
SNAP RINGS
PREDOMINATE

THE Piston RING COMPANY
MUSKEGON, MICH.

The famous Caille five speed motor. Has reversible propeller. Starts with a starter. Magneto built into flywheel. Water cooled exhaust. Finest rowboat motor made.

Caille Neptune Rowboat Motor. A dandy, low-priced motor for general use.

Here's *Your* Motor

Here's the motor for that boat of your dreams—canoe, rowboat, launch, cruiser, workboat—anything that floats and doesn't require over 20 H.P. to send it along at a lively clip. They're not just engines—they're motors tailored to particular types of boats.

If you want to power a rowboat or canoe there are four types of Caille motors to select from. There's the famous Five Speed Motor—the highest development in the outboard motor art. The Caille Neptune Motor ranks a close second and sells at a lower price. The Liberty Drive Motor is the greatest weed eluder you ever saw. Just goes through them like an eel. For an inboard rowboat installatioh you can't beat the Caille Bantam Motor. Easiest motor to install you ever saw.

For larger boats, we build a complete line of motors from 2½ to 20 H.P. Some are shown on this page. They are built in one to four cylinders—two and four cycle types for standard and heavy duty service. The most complete line you ever saw at right prices.

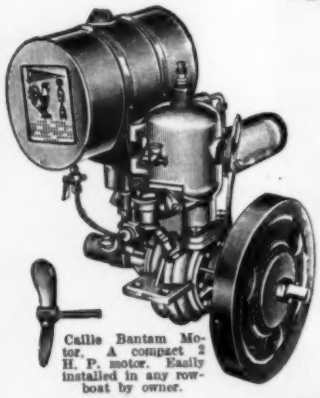
Then there is the Caille Watermobile—a complete water outfit ready to run the minute you launch it. Comprises boat and motor installed. It's like buying a car—you step in, start it up and off you go. No tinkering, no work, no worry. Send for special literature.

We can't go into details here. Our catalogs give all the dope. Tell us about your boat and we'll send you literature on the proper type of motor. Remember, Caille motors are real quality motors—built to S. A. E. standards—carefully inspected step by step in manufacture, tested under their own power when completed and are the result of our 20 years' experience in marine engine design and manufacture. Write us. Let us send you all the facts.

THE CAILLE PERFECTION MOTOR CO.,
42 Caille Bldg., Detroit, Mich.

CAILLE

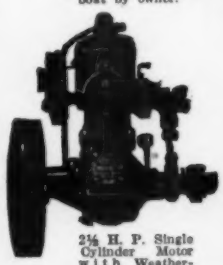
MEANS ENGINES OF QUALITY



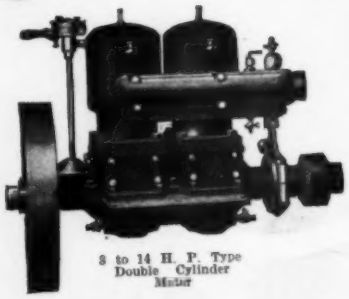
Caille Bantam Motor. A compact 2 H. P. motor. Easily installed in any rowboat by owner.

Caille Liberty Drive Motor. Sensational performer in weedy or shallow water. It attaches to any rowboat. Just the thing for sportsmen.

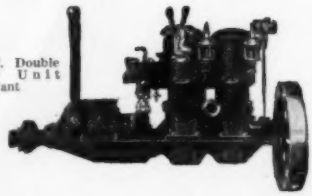
Caille Rowboat Motors
$75.00 and up. A motor for every purse.



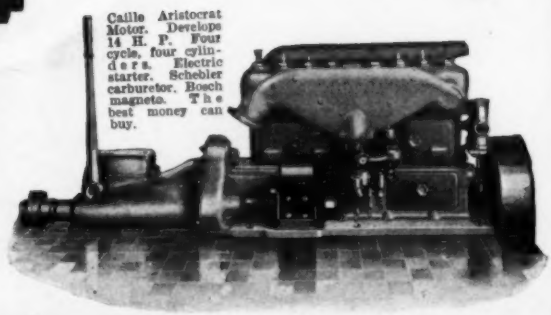
2½ H. P. Single Cylinder Motor with Weather-Proof Igniter



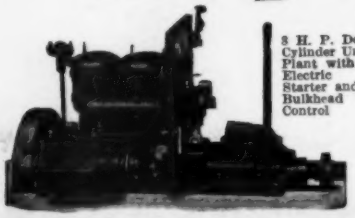
3 to 14 H. P. Type Double Cylinder Motor



8 H. P. Double Cylinder Unit Plant



Caille Aristocrat Motor. Develops 14 H. P. Four cycle, four cylinders. Electric starter. Schebler carburetor. Bosch magneto. The best money can buy.



8 H. P. Double Cylinder Unit Plant with Electric Starter and Bulkhead Control

Advertising Index will be found on page 192

"PLANK WITH CYPRESS AND YOU PLANK BUT ONCE."

A Runabout or a Cruiser.

Plank her with non-rot, non-warp, genuine

"TIDE WATER"

CYPRESS

"THE WOOD ETERNAL"

"OF COURSE"

For all marine use SPECIFY "ALL-HEART" GRADE. It assures the boat owner satisfactory service in the highest degree.

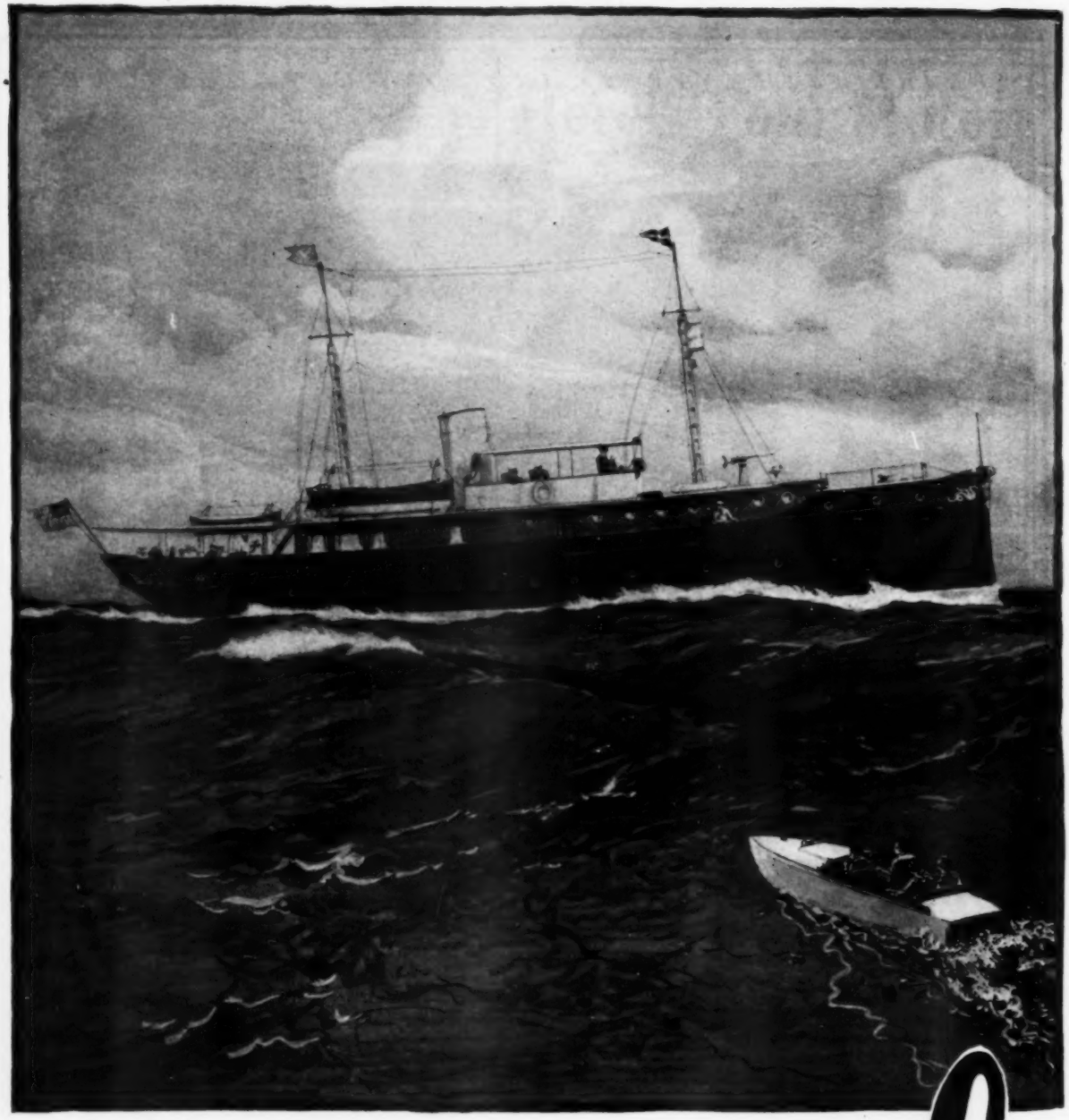
He will be immune from the annoyance and expense of oft-recurring repair bills, which take the joy out of the sport of motor-boating. "Plank with Cypress and you plank but once." Send for

FREE BOOK *Volume 19*, of the famous Cypress Pocket Library, and get *all the facts* about the good properties of Cypress, the best lumber for boats, big or little. Also ask for Volume 1, with complete Government report. Address:

Your local dealer will supply you. If he hasn't enough **Cypress** let us know at once.

SOUTHERN CYPRESS
Manufacturers' Association
1317 Poydras Bldg., New Orleans, La., or
1317 Graham Building, Jacksonville, Fla.

Insist on "tide water" Cypress—you can identify it by this mark:

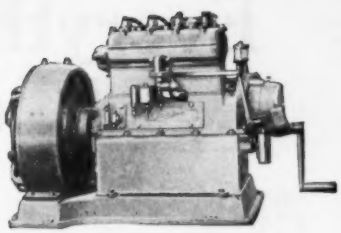


Building for Alfred I. duPont, Esq., designed by Edward R. Carroll. Tenders powered with Universal Marine Motors. Electric current supplied by two Universal Electric Generating Sets.

Universal

MARINE ENGINE

"UNIVERSALS" for Service!



THE picture on the opposite page shows the yacht "Nenemoosha" which is being built for Mr. Alfred I. du Pont, Wilmington, Delaware, from the plans of Mr. Edward R. Carroll, Naval Engineer.

The tenders are equipped with two Universal Marine Motors, and two Universal 4 kw. electric generating sets will furnish the electric current for this yacht.

The selection of this Universal equipment was made by the engineers and builders entirely with the idea of service. Naturally, the owner of such a yacht is in a position to buy the very best that can be had. This is just one more of a great number of extraordinary testimonials to the unusual excellence of design and construction of Universal Marine Motors and Universal Electrical Generating Sets.

For years the Universal Marine Motor has been the standard 4-cylinder 12 h. p. motor —one of the pioneers of its kind and the unquestioned leader today. Not only motor boat owners of the United States, but throughout the entire world, recognize the world wide reputation of the Universal engine.

Conditions have made it possible to announce new and somewhat lower prices, effective January 1st, on Universal Marine engines.

It will pay you to send for the Universal catalog and find out why Universal engines are chosen, not only for all types of motor boats, from the speedy runabout to the family launch, but also for tenders for such yachts as the "Nenemoosha."

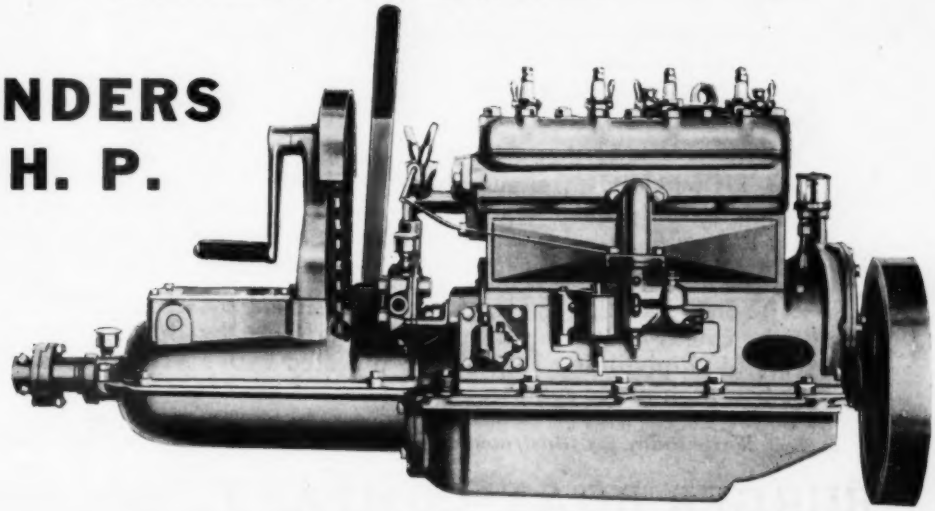
There is only one size and one quality of Universal Marine engine—4-cylinder 9-12 h. p., standard the world over.

UNIVERSAL MOTOR COMPANY

OSHKOSH, WISCONSIN

Not connected with any other company using the name Universal

4-CYLINDERS
9-12 H. P.



Everything You Want In a Cruising Boat

50 ft. of cruising comfort in a 36 ft. boat.

BURGER
BOATS BEAUTIFUL

The remarkable thing about the standardized Burger 36 ft bridge deck cruiser is a sense of roominess and luxury that makes one feel he is cruising in a modern yacht of 50 to 60 ft. So skilfully has it been designed that it embodies all the accommodations and all the comforts usually found in a cruiser half again as large.

And to the excellence of design and arrangement we have added a degree of quality in workmanship, materials, equipment and sturdiness of construction that is found only in the work of the best high grade builders.

This is a boat that will merit respect and admiration in your club fleet. It will carry you and your guests wherever you wish to cruise, with complete comfort and dependability. It is a most satisfactory boat to own, easy to handle, economical to maintain, a source of unlimited pleasure to the man who loves the water.

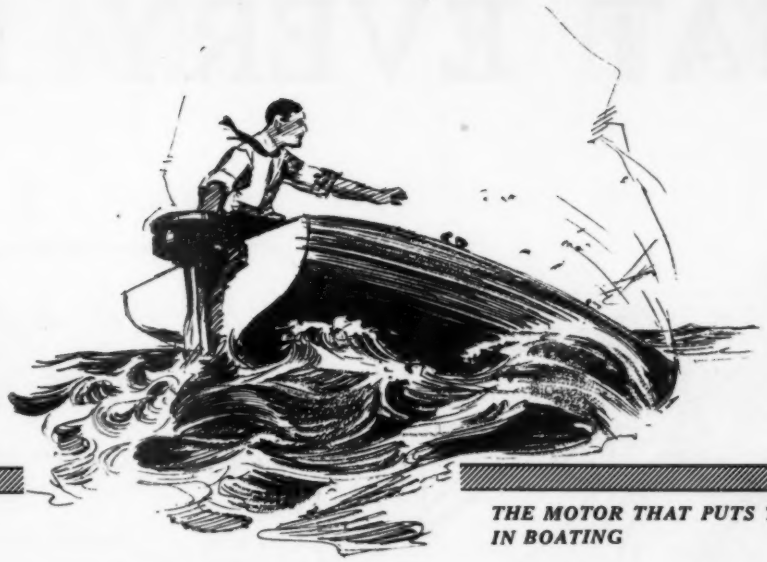
You'll like the Burger Cruiser. Designed by Chas. D. Mower, one of the country's leading naval architects; built by Burger, with over 60 years of shipbuilding experience; powered with a Scripps motor, one of the best high grade engines.

Write today for illustrated catalog. Immediate and spring deliveries.

BURGER BOAT COMPANY, Manitowoc, Wisc.

Advertising Index will be found on page 192

$90
WITH BATTERY IGNITION



$95
WITH MAGNETO IGNITION

THE MOTOR THAT PUTS THE TING IN BOATING

The thrill of power boating at a fraction of the expense

The lure of the water highways sparkles the same invitation to the *Spinaway* propelled craft as to the expensive motor boat. Waves are just as dancing, skies just as blue, fun just as keen —and it's all yours at an operating cost that scarcely disturbs the loose change in your pocket.

A rowboat is just a rowboat until you clamp a *Spinaway* Motor on the stern. Then it's a power boat—but what a difference in the expense! A fraction of the cost as regards initial investment. A fraction as regards care. No Government tax to pay. Nothing to put out except a trifling amount for gas and oil. No wonder many people who *have* motor boats are running around with *Spinaways* in preference to getting the big boats into the water, putting out money for their upkeep and paying the tax.

Spinaway Detachable Rowboat Motor

Spinaway engineering skill gives you the most perfected detachable marine engine. The *Spinaway* is just as fool proof as it is powerful. No mechanical knowledge or experience necessary to operate it. Patented Disappearing Crank Handle protects you and your crew. Spark plug is protected. There's not a spot in the design where you can get your fingers in. Motor tilts automatically when hitting an obstruction. Tiller is self-locking. Silent running assured by underwater exhaust.

You can't think of a single point to promote safety, *ease of operation, power* and *beauty* of *design* that *Spinaway* engineers haven't already worked out for you. The *Spinaway* is the "Beauty Motor" — dependable and economical to the last degree.

Dealers

Spinaway representation is open for certain sections. We will be pleased to advise reliable dealers regarding our Dealer Plan.

THE COUPON BRINGS THE FULL STORY

And what an interesting story it is in the unusual form we offer it! A catalog that hasn't a dry spot in it. A Specification Sheet, different from anything you have ever seen, that dissects the Motor thoroughly and bares every mechanical point to your closest inspection.

Send for this material now—NOW when you mean to do it.

SPINAWAY BOAT MOTOR CO.

Owned and controlled by HOEFER M'F'G. CO.

235 So. Chicago Avenue, Freeport, Ill.

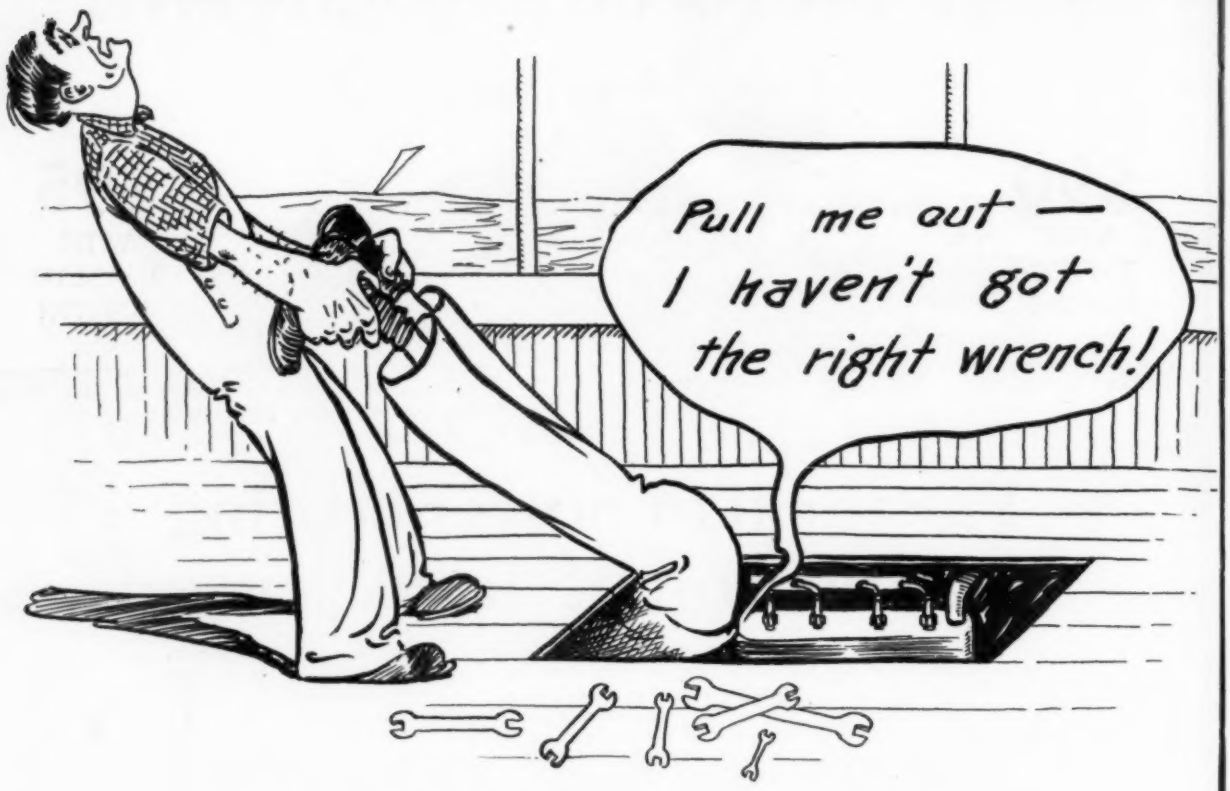
SPINAWAY BOAT MOTOR CO.
235 So. Chicago Ave., Freeport, Ill.

GENTLEMEN: You may send me the full story and specification sheet of the Spinaway Detachable Rowboat Motor.

Name.....

Address.....

WHAT EVERY BOA



TRADE MARK
REG. U.S. PAT. OFF.
NO. 64696

Coes

WRENCHES

Advertising Index will be found on page 192

OWNER KNOWS

Everybody has two hands. But if you are forced to carry a handful of "open-enders" down a ladder to operate on one nut,-- *How about it, how many hands have you ?*

One "COES" will fit a basket-full of nuts, hex, square, old, new, whether they are rusted on or not. You have one hand free to wipe your nose or hold a torch.

And when you pull --- the nut starts or you tip the boat over. Fact, brother, 'sa fact.

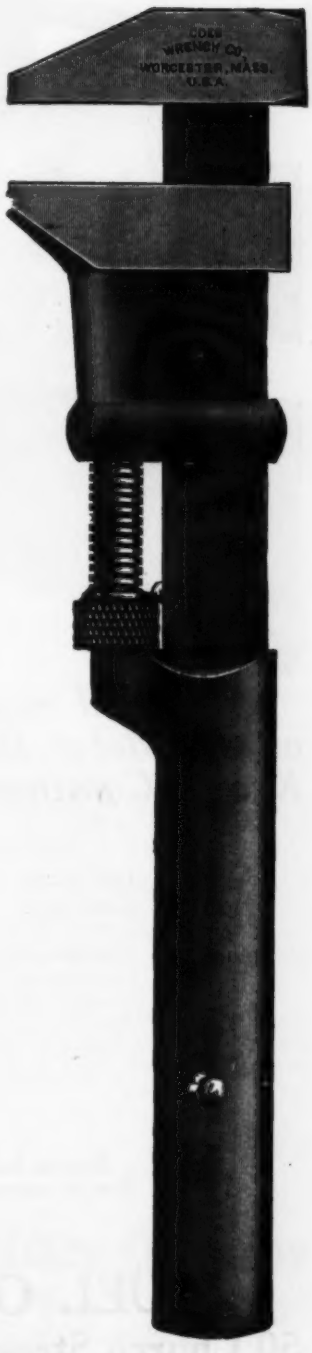
And the range of sizes, 4" to 72", in 12 sizes, will cover anything from spark-plugs to propeller nuts.

Sold by all reliable jobbers and dealers.

Ask yours.

COES WRENCH COMPANY

WORCESTER, MASS.



See This Motor at the Show

18-25 H. P. KRAUS OIL ENGINE
Weight 513 lbs.

You will miss one of the most interesting features of the Motor Boat Show if you miss the exhibit of the Kraus (Continuous Combustion) Fuel Oil Engine.

The Kraus is a light weight, high speed, oil engine that may be run on any liquid fuel,—crude oil, vegetable oil, alcohol, kerosene, or distillate.

It is an internal combustion engine but it operates on entirely different principles from any other oil, kerosene or gasoline motor. It has no carburetor, magneto or complicated ignition system. Only one spark plug, regardless of the number of cylinders, and that plug is used for starting only. The motor never requires cleaning—no carbon troubles to overcome. It has the combined advantage of the steam as well as gas engine. Its operating cost is only about 1/6 as compared to gasoline engines.

We are prepared to issue licenses on a royalty basis for manufacturing the Kraus Oil Engine.

Engine builders will find it more profitable to manufacture this engine than to compete with it. A demonstration will show you why.

Full data on request by mail

FUEL OIL MOTORS CORPORATION

50 Church Street **New York, N. Y.**

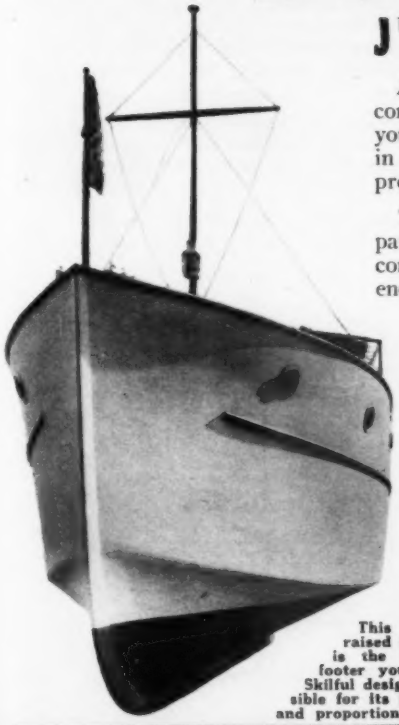
Advertising Index will be found on page 192

The Cruiser Sensation of 1922

$1500
Completely Equipped

DELANCO 27

The Delanco 27. Length 27'. Beam 8' 6". Draft 2' 6". Speed 9 miles



This V-bottom raised deck cruiser is the biggest 27-footer you ever saw. Skilful design is responsible for its perfect lines and proportions.

JUST think of it! A well designed, well built, well finished motor cruiser, equipped complete to the last detail, all for $1500.

A boat you can handle alone, big enough to entertain a party of eight or ten, complete enough for a month's cruise, fast enough to pass most of the cruisers you meet. An up to the minute V-bottom raised deck cruiser that lacks nothing in accommodations or appointments, furnished all ready to cruise at a real pre-war price.

The Delanco 27 is designed and constructed by experts. The plans were prepared especially by J. Murray Watts, the celebrated Naval Architect. The construction is carried on in our well organized boat building plant by experienced boat builders under expert supervision. Standardization and quantity production have cut the cost in two!

Delanco 27 is a good sea boat, staunchly built, easy driving, easily handled, dry and safe to navigate in any weather. Steam bent oak frames spaced 12" on centers, planked with white pine, well caulked above and below the water line,—these things insure a hull that will last a lifetime, and ride a gale without springing a leak.

You'll find the Delanco 27 your ideal of a small cruiser,—ideal in appearance, comfort, arrangement, equipment and service.

Delanco Shipbuilding Company

Delanco, N. J.

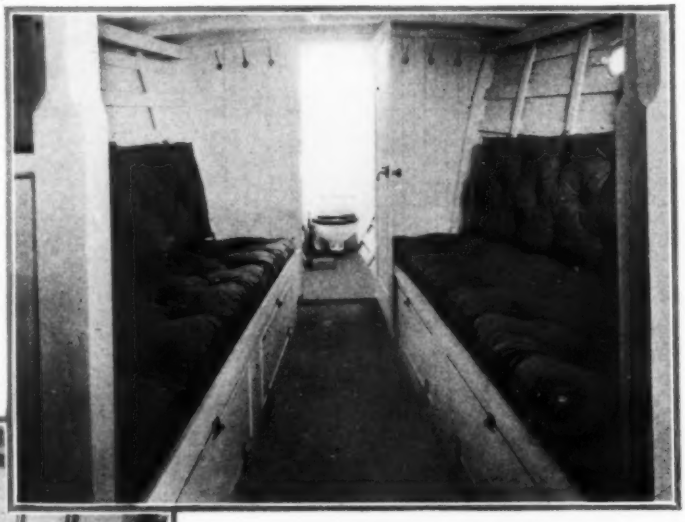
(On Delaware River near Philadelphia)

DELANCO 27 — A Summer Home

Cozy Comfort and Completeness Are Featured in this Cabin

YOU never saw such a complete, roomy and well arranged cabin in any cruiser under 32 ft. Main cabin is 6′ 8″ long, or 10 ft. long including the galley, finished in white. Headroom is 5′ 8″. Wide berths fitted with four thick serviceable khaki-covered cushions and backs mean comfortable sleep. A hatch forward, together with six large ports, keeps the cabin always cool and well ventilated.

Wide lockers under the berths and plenty of clothes hooks add to the convenience. The toilet is in a separate compartment, 3′ 4″ in length. A hatch over the toilet simplifies handling the anchor in rough weather. In the peak is the 15-gal. water tank, rope and dunnage space. A stout sampson post is an important feature.



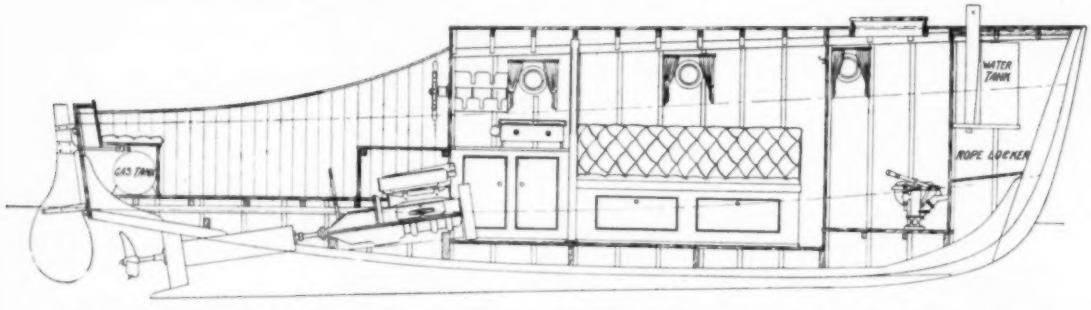
Cabin looking forward

Cabin looking aft

THE motor is the popular Kermath 16 H.P. unit power plant with 5-plate multiple disc clutch, reverse gear, thrust bearing, Kingston carburetor, water pump, oil pump, etc. Ignition by American Bosch High Tension Magneto with impulse coupling makes batteries unnecessary.

Bronze propeller shaft and Columbian Wheel. Salt water fittings. Gasoline tank holding 32 gallons is under the seat across the after end of the cockpit.

We have supplied the Delanco 27 with every necessary equipment—nothing more to buy but gasoline.



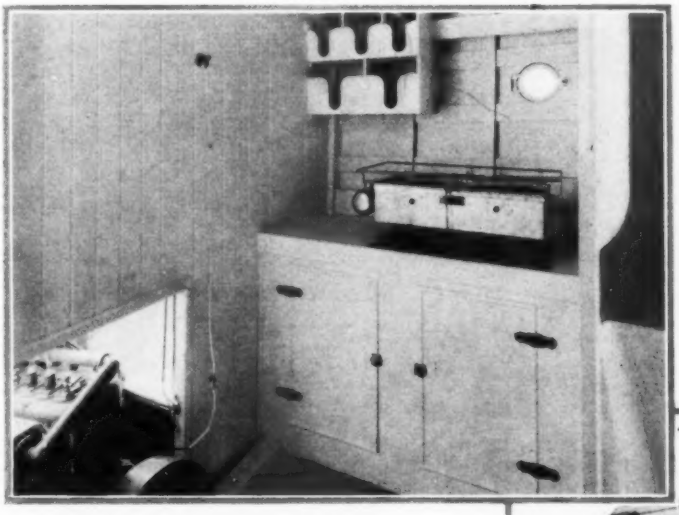
Study this arrangement and you will see what a complete little ship the Delanco 27 really is. We have forgotten nothing and crowded nothing to get it all into 27 feet, the biggest 27 feet of boat you ever saw.

Advertising Index will be found on page 192

on the Water

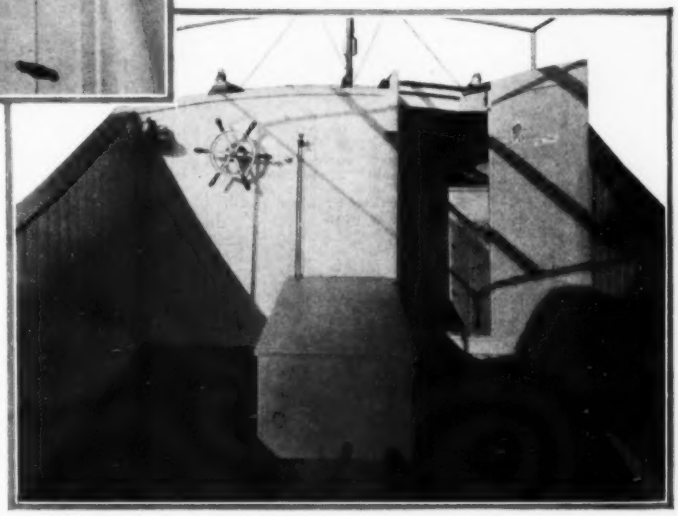
DELANCO 27

Galley and Cockpit Are All You Could Desire



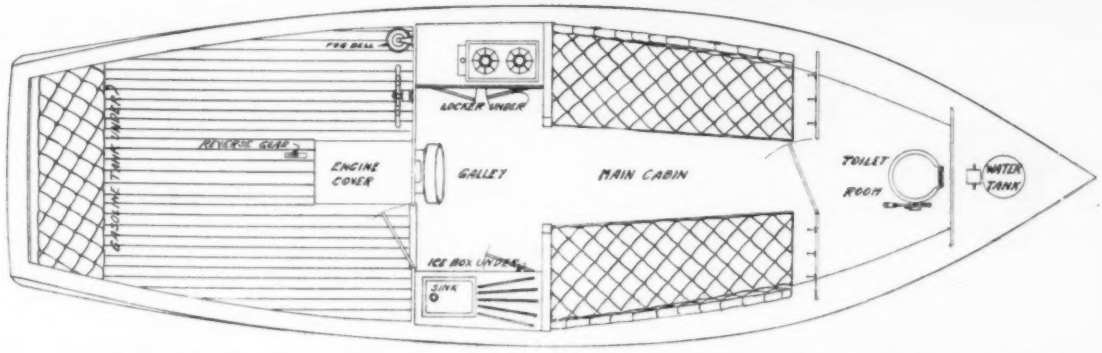
IT'S fun to cook in the Delanco galley, with everything at your fingers' ends. The two-burner gasoline stove is the famous "Kamp-Kook," with dish rack above and large provision lockers below. On the starboard side is a blue and white enamelled sink with running water, and ice box below. This galley location is most convenient whether you eat in the cockpit or in the cabin.

A big comfortable cockpit is vital—in the Delanco it is 9′ 8″ long with khaki awning overhead on strong galvanized stanchions, cushioned seat across the stern and plenty of room for additional chairs.



ALL motor controls are brought up to the wheel, with reverse lever in cockpit floor and a seat-height box over the motor which makes all motor adjustments accessible when removed. The cockpit is self-bailing, with floor several inches above the water-line.

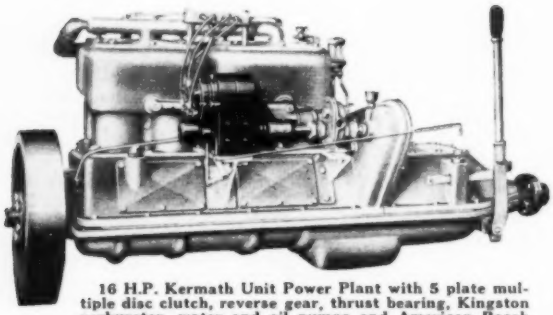
The canvas-covered deck forward is flat enough to work from, and its sawed deck beams make it strong enough to support several persons. An 8-ft. military mast with galvanized stays adds to the appearance.



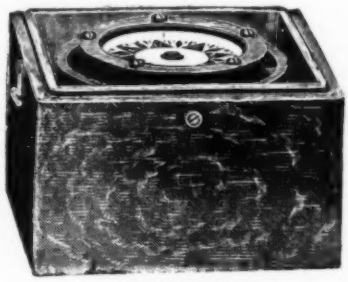
Now, isn't this the kind of motor boat you want to own? The fuel economy and low cost of a small boat with all the essentials and comforts of a complete cruiser. They are perfectly combined in the Delanco 27.

DELANCO 27

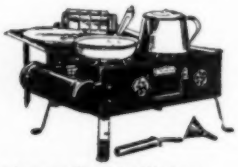
The completeness of the Delanco 27 design is equalled only by the completeness of its equipment. We supply everything you need, every fitting selected especially for its quality and suitability for this boat.



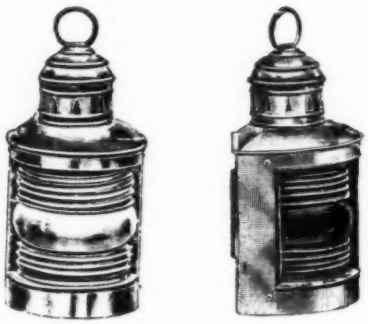
16 H.P. Kermath Unit Power Plant with 5 plate multiple disc clutch, reverse gear, thrust bearing, Kingston carburetor, water and oil pumps and American Bosch High Tension Magneto with impulse coupling.



Liquid Compass

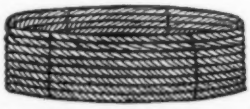


Two burner Prentiss Wabers "Kamp-Kook" Stove; burns gasoline with a hot blue flame that won't blow out in a 30-mile wind.



Galvanized running lights

Fog Horn



75 ft. 5/8" diameter manila anchor line

Brass Fog Bell

25 lb. Anchor

Laughlin "Victor" Yacht Toilet

Jack and Ensign on fore and aft flag staffs

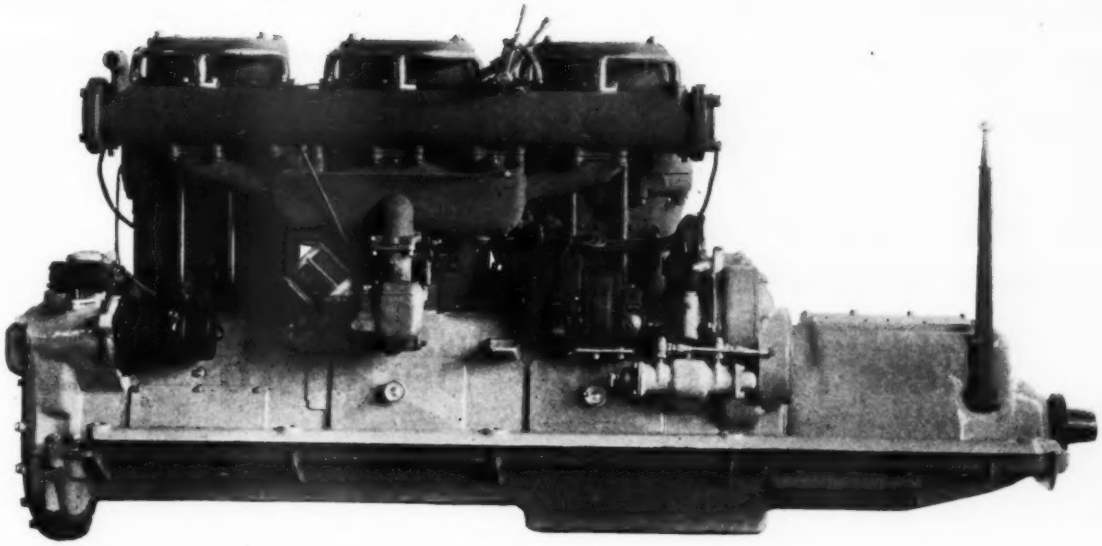
All this included with the Delanco 27 for $1500.00 complete (except tax).

Order now for Spring. Deliveries by water or rail, anywhere. Write today for detailed specifications.

Delanco Shipbuilding Company — Delanco, N. J.

(On Delaware River near Philadelphia)

Advertising Index will be found on page 192



The Trident Model

Medium and Slow Speed 6 Cylinders, 94 H.P.
Bore 5¾", stroke 6¾", 200 to 800 R.P.M.

In four years, gasoline has declined in grade from 68-70 degrees to 54-56 degrees—approximately 20%. Your motor, which may be showing results of poor fuel in increased wear of pistons and cylinders, hard starting, loss of power, now, what will it do next season?

Overhead Dual Valve STERLINGS were designed expressly to develop higher power on this poorer fuel. A horsepower is delivered on approximately 13% less gasoline. 13% off your fuel bills each year—does it interest you?

Motors are being exhibited at the Motor Boat Show, Grand Central Palace, February 17-25. Exhibitions also at many dealers, located in all principal waterside cities, with facilities for service. Literature on request.

Principal Dealers:

W. H. Moreton Corp., Boston, Mass.
Bruns, Kimball & Co., New York, N. Y.
Bruns, Kimball & Co., Philadelphia, Pa.
Unger & Mahon, Inc., Baltimore, Md.
Stauffer, Eshleman & Co., New Orleans, La.
J. N. Vernam, S. Jacksonville, Fla.
W. L. Masters & Co., Chicago, Ill.
F. G. Epton, Portland, Ore.
Atlas Gas Engine Agency, Seattle, Wash.
A. G. Hebgen, San Francisco, Cal.
Fellows & Stewart, Los Angeles, Cal.
Ferrier & Lucas, Vancouver, B. C.
Can. Motor & Yacht Co., Montreal, Que.
Canadian Beaver Co., Toronto, Ont.
Ditchburn Boats, Ltd., Gravenhurst, Muskoka.
St. Lawrence River Motor & Machine Co., Clayton, N. Y.

Sterling Engine Co.

1254 Niagara Street Buffalo, New York

12 to 600 H.P. High Speed, Medium Duty, Slow Speed

Where There's Work

HONEST

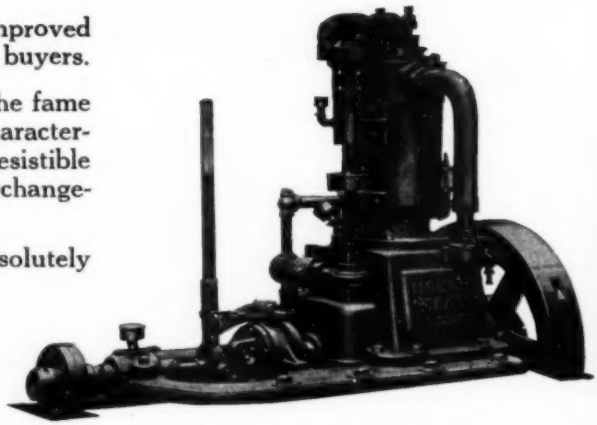
New Model "M" Series for 1922

HONEST CLAYS have been refined and improved both in appearance and operation for 1922 buyers.

The new Series "M" will more than uphold the fame of Honest Clays. For we have added to the characteristic Clay qualities of rugged strength and irresistible power, a degree of standardization and interchangeability seldom found in a machine of this size.

All parts of the model "M" engine are absolutely standard and interchangeable.

Honest Clay is the engine for hard working commercial boats and heavy cruisers. It is built to last a lifetime of continuous heavy service.



Single Cylinder, 6, 8 and 10 H. P.

Four cylinders, 25, 35 and 50 H. P.

HONEST CLAY PRINCIPLES

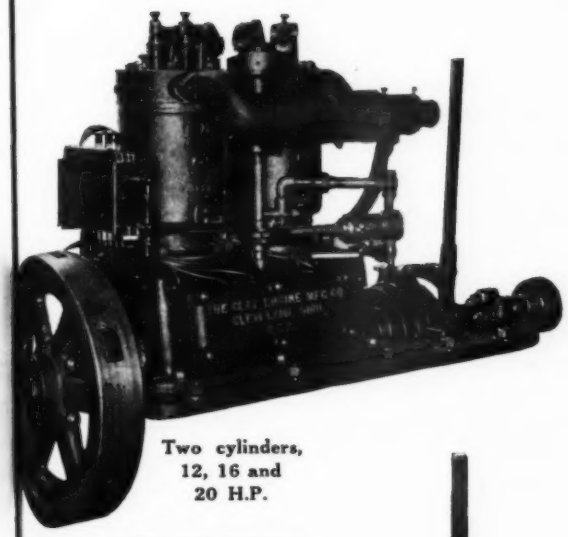
- Four Cycle
- Heavy Duty
- Slow Speed
- Valves in Head
- Mechanically Operated Valves
- Fuel Economy
- Rugged Construction
- Reliability
- Simplicity
- Long Life
- Satisfaction

Advertising Index will be found on page 192

to be Done — Get the

CLAY

Prices Reduced February 1st



Two cylinders, 12, 16 and 20 H.P.

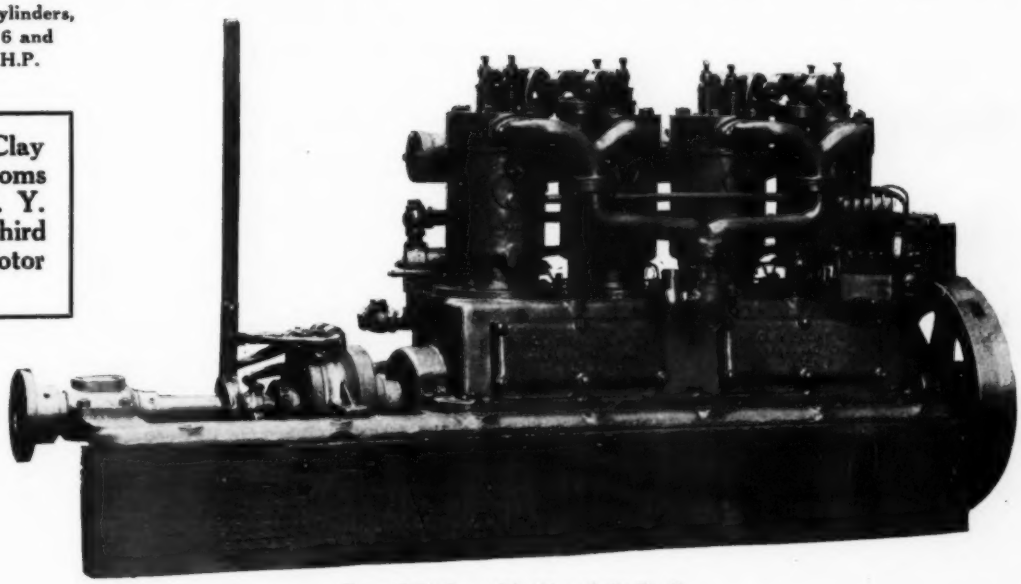
With new reduced prices in effect February 1st, we offer you a better engine with more equipment for less money.

Although the Model M is a new motor it is a perfectly logical evolution of the first Honest Clay built nearly 25 years ago. It shows the advantage of 25 years manufacturing experience and 25 years service experience.

Every Honest Clay is guaranteed to develop its full rated power on dynamometer test. What is more important, it will develop its full rated power in your boat after long years of hard service.

Write us today for catalog and prices

SEE the Honest Clay at the Show Rooms of Sutter Bros., N. Y. Distributors, 44 Third Ave., during the Motor Boat Show.



Four Cylinders, 25, 35 and 50 H. P.

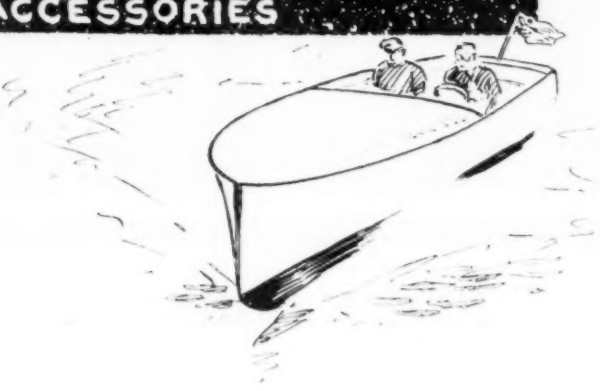
THE CLAY ENGINE MANUFACTURING COMPANY

664 EAST 72nd STREET **CLEVELAND, OHIO**

LUNKENHEIMER

AUTOMOTIVE ACCESSORIES

It's a Good Name to Remember



WHEN a company has grown to be the largest of its kind throughout the whole world, you're pretty certain of the merit and uniform quality of its products.

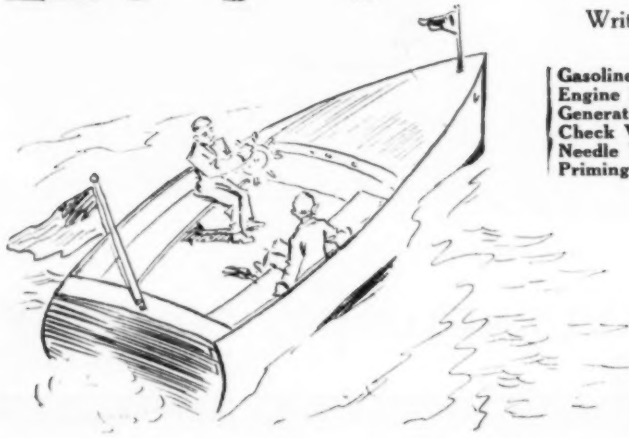
Furthermore you can figure that volume production in a big completely equipped factory insures the lowest prices consistent with a quality product. Can you as a buyer afford to overlook the protection of such a guarantee?

Specify LUNKENHEIMER

When in the market for automotive or engineering specialties of any kind, whether it's a little oil cup or a big steam valve, remember LUNKENHEIMER and specify this brand by name. No doubt many LUNKENHEIMER fittings are already used on your boat and engine.

Leading dealers everywhere sell Lunkenheimer Accessories. The best marine engine and boat builders are large users of Lunkenheimer products. You'll find we make just what you're looking for.

Write today for Catalog 5-CC.



Gasoline Strainers	Ground Key Cocks	Air Whistles
Engine Primers	Oil Cups	Whistle Valves
Generator Valves	Grease Cups	Air Pumps
Check Valves	Sight Feeds	Oil Pumps
Needle Valves	Oil Gauges	Tubing Unions
Priming Cups	Multiple Oilers	Bronze Fittings

THE LUNKENHEIMER CO.

"QUALITY"

LARGEST MANUFACTURERS OF HIGH GRADE ENGINEERING SPECIALTIES IN THE WORLD

NEW YORK CHICAGO CINCINNATI, U. S. A. BOSTON LONDON

EXPORT DEPT. 129-135 LAFAYETTE ST., NEW YORK

Advertising Index will be found on page 192

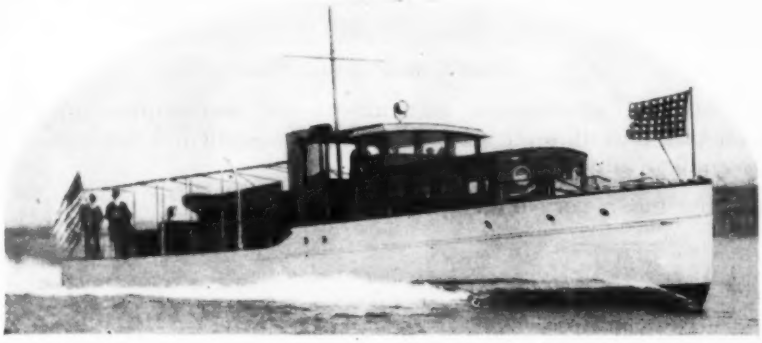
DENSMORE STANDARDIZED YACHTS

Length 73'
Beam 12'9"
Draft 4'0"

Length 36'
Beam 9'6"
Draft 2'8"

Wonderful is the opinion of yachtsmen who have seen the Densmore 73' x 12' 9" Cruiser. From stem to stern the best of materials and construction find their place in every detail and appointment.

While moderate in size and cost here is every convenience for living and comfort found in yachts of far greater dimensions



Seaworthy to a high degree and with a fair turn of speed

Densmore Standardized 36 Foot Cruiser

36'—3½" x 9'—6" x 2'—8"

Designed and constructed for the owner desiring beauty, seaworthiness and a small home afloat.

Gasoline is all you will require for your first cruise, for standard equipment includes bilge pump, flag poles, signal mast, fire extinguishers, lines, anchor, name and hail and license numbers, electric and kerosene running lights, fog horns, fog bell, electric horn, cushions for cabin and bridge seat, two upholstered pullman type berths, four fenders, compass, boat hook, mop, canvas pail, ice box.

She's ready to start at our dock when you call for her. or should you desire we can ship your boat for this winter's Florida use.

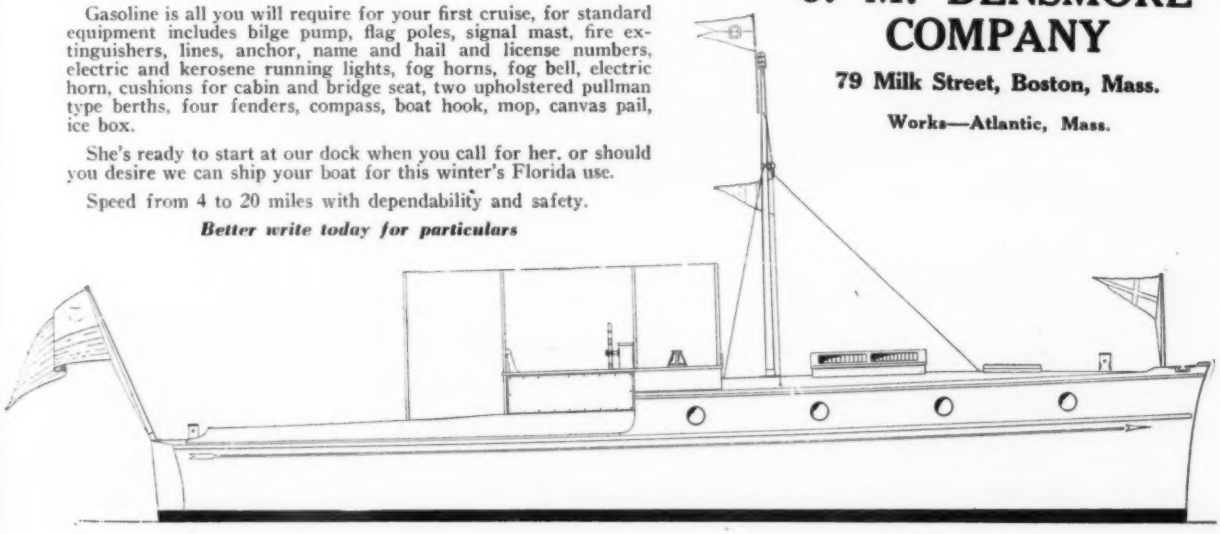
Speed from 4 to 20 miles with dependability and safety.

Better write today for particulars

J. M. DENSMORE COMPANY

79 Milk Street, Boston, Mass.

Works—Atlantic, Mass.

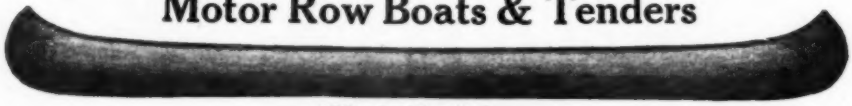


Trade Mark

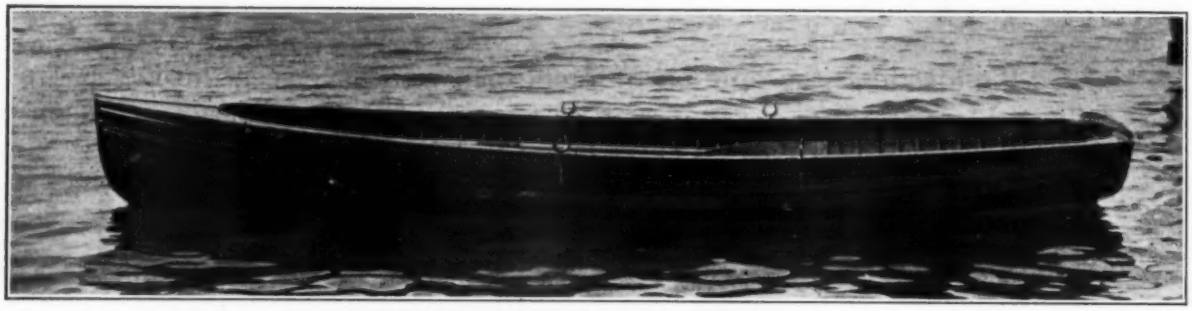
"Whistle Wing"

Trade Mark

Canoes—St. Lawrence Skiffs
Motor Row Boats & Tenders



"Whistle Wing" Canoe

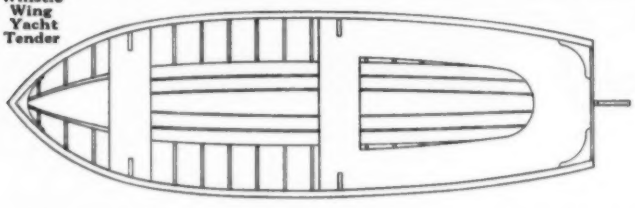


"Whistle Wing" Square Stern Rowboat

We show here cuts and photographs of some of our best known products. Each model has been given much care and thought in the designing thereof and we guarantee our workmanship and material second to none.

We are also turning out a very high grade Canvas Canoe.

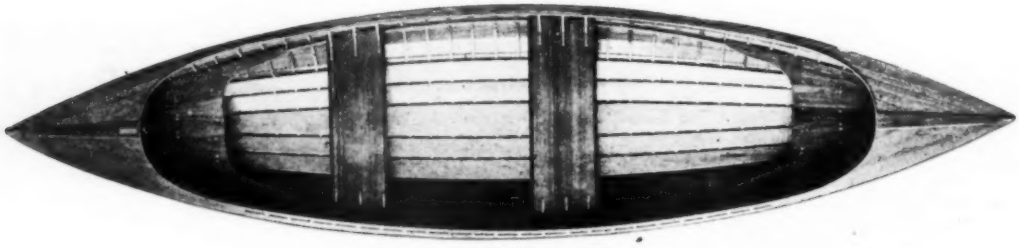
Whistle Wing Yacht Tender



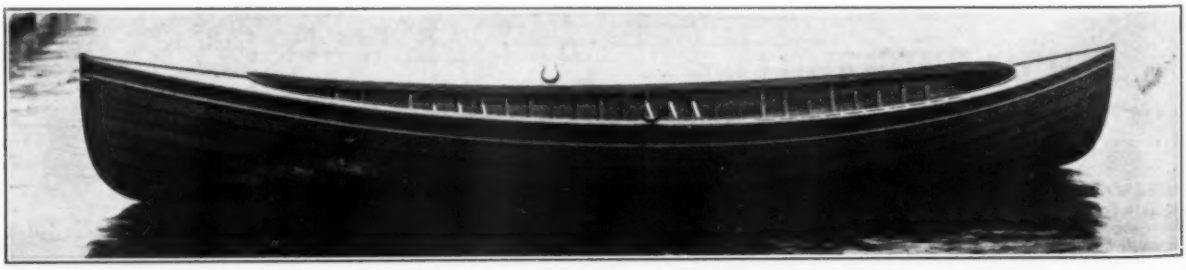
These products will be on exhibition in Space D-2 at the Motor Boat Show in New York City, February 17th to 25th.

If you are interested in small boats or canoes, we feel that it will pay you to get in touch with us.

ST. LAWRENCE BOAT WORKS, INC., Ogdensburg (on the St. Lawrence), N.Y.



"Whistle Wing" St. Lawrence Skiff



Advertising Index will be found on page 192

LET US TELL YOU

How important it is to Use

KIRBY PAINT

Because—

We have been Manufacturers of Marine Paint for more than Half a Century

We make a Full Line for Every Need of Motor Boats, Yachts and Boats of All Kinds

We make the Best of Quality and the prices give real and big value—a fact proven in the steady growth of our Business in the past fifty years,

Our paints are used extensively along the Atlantic Coast, from Maine to Florida

KIRBY FLAT YACHT WHITE
Popular with Every User

Our Specialties in Anti-Fouling Paints

GREEN AND RED YACHT COMPOSITE

OLD STYLE BROWN AND RED COPPER

and

NEW BEDFORD BRONZE
(Pure Copper and Anti-Fouling Liquid)

OTHER MARINE PAINTS WITH OUR REPUTATION

Once You Try—You'll Always Use

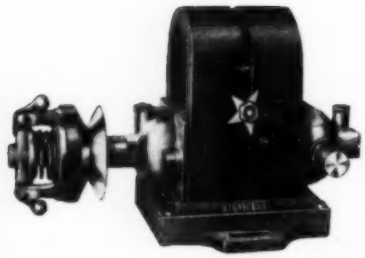
IMPORTED HOLLAND WHITE ENAMEL

GEORGE KIRBY JR. PAINT COMPANY

NEW BEDFORD MASSACHUSETTS

COMET

Boat Lighting Plants



Comet D. C. Magnetos

THE climax of 25 years' experience in building direct current magnetos for marine use. Their construction has been refined to the last word of perfection in every part and every detail.

Driven by friction pulley, plain belt pulley, or belt governor pulley. Designed for Make and Break, or for Jump Spark.

Ask for Bulletin 1 A

COMET Boat Lighting Plants are built in several sizes and combinations suitable for every size and type of pleasure and commercial boat, from the smallest open motor boat to the largest cruising yacht. Each Comet set has been designed by experienced electrical engineers fully conversant with motor boat requirements. Every Comet product is built in a factory devoted to boat lighting plants.

For smaller and medium size boats we furnish Comet Generators in 8 or 16 volts with 5, 10 or 15 ampere capacity. Driven by friction or belt with special governor pulley.

For larger cruisers, houseboats and yachts the 32-40 volt Comet plant is furnished in eight sizes with 12½ to 50 ampere capacity. We also supply 110-volt Generators or complete 110-volt Plants built especially to meet the conditions required by each installation.

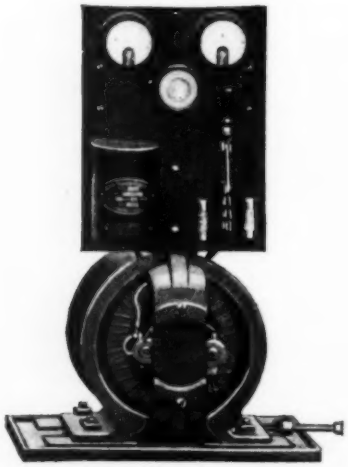
Details of generators, switchboards, capacity, drive, etc., are shown in our Bulletins. Ask for Bulletin No. 5.

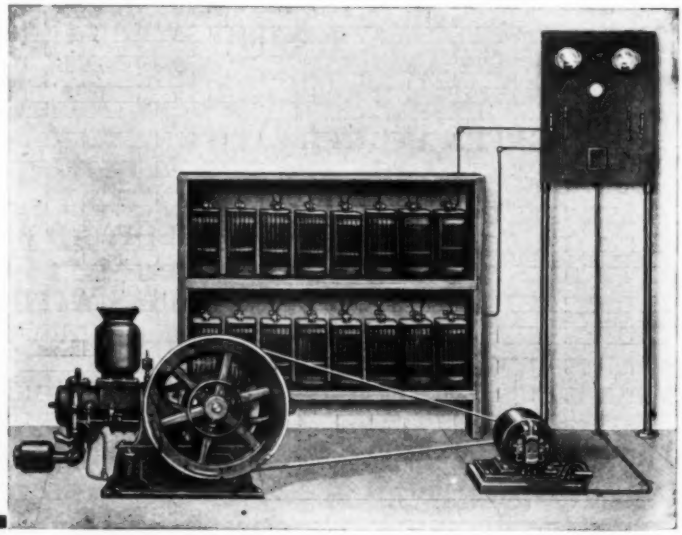
Write us the details of your boat and let us describe the proper Comet plant for you and tell you what it costs.

COMET ELECTRIC COMPANY

1241 St. Paul Street

INDIANAPOLIS INDIANA

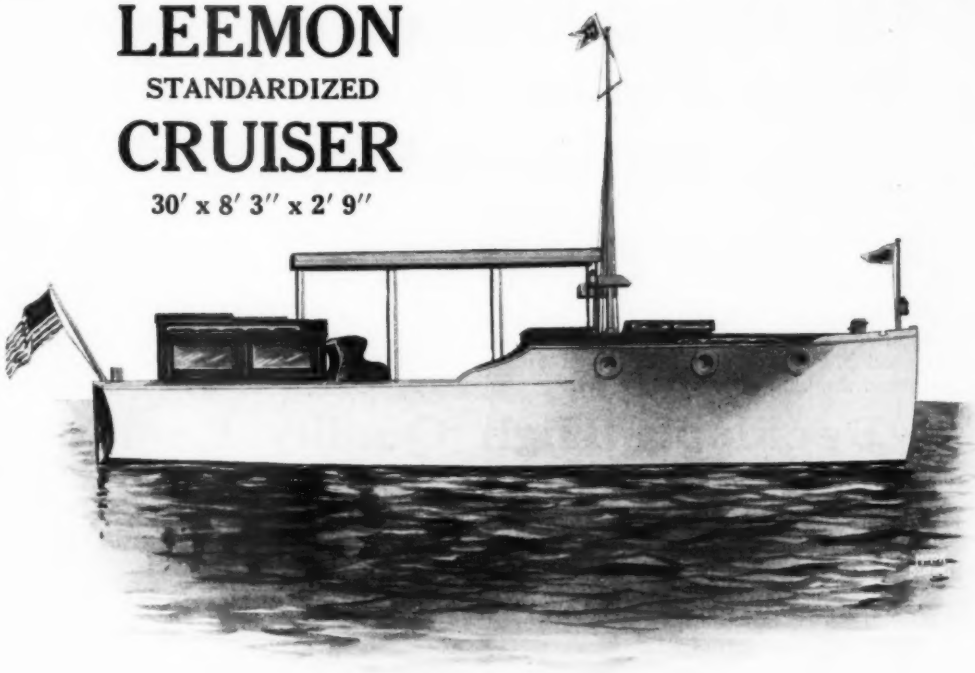




Advertising Index will be found on page 192

30 Feet of Comfort and Class

LEEMON
STANDARDIZED
CRUISER
30′ x 8′ 3″ x 2′ 9″



Solid Comfort and Honest Pride Go Hand in Hand for the Owner of a Leemon Cruiser

Speed 8½ to 17 miles per hour, according to power installed.

Sleeps four comfortably in forward cabin, full headroom. Separate toilet and large clothes lockers forward. Bulkhead with sliding door separates engine room from cabin.

Large bridge deck with comfortable seat and room for several wicker chairs. Self bailing, floor 12" below deck line. Flush hatch over motor gives complete accessibility when raised. Large galley in trunk cabin aft. Full headroom. Portable table. Two 45 gallon fuel tanks, one on each side of engine below the bridge deck.

Exterior brightwork fine mahogany with brass hardware. Interior white enamel, mahogany trim. Underbody has three coats anti-fouling paint. Topsides three coats best Yacht White.

Planking 1¼" cypress, copper riveted on oak frames, closely spaced and steam bent. Completely equipped with yacht toilet, lavatory, galley sink, fresh water and fuel tanks.

AS a source of recreation and pleasure, you are entitled to expect two things in your boat.

Real comfort is one of them,—comfortable sleeping quarters, comfortable living quarters, comfortable cockpit and galley. That means a double cabin boat with roomy accommodations, full headroom inside, and proper separation of galley, motor, main cabin and toilet.

Then you want a boat you can be honestly proud to own,—proud of its appearance, its beauty of finish and excellence of arrangement. That calls for skilful designing and master workmanship in the building.

ALL THIS WITHIN 30 FEET.

The standardized Leemon 30-footer is an all around boat. We call it a day cruiser because it has such a roomy cockpit and such careful arrangement that it can accommodate a large party without crowding or discomfort.

But you may call it a week-end cruiser, a speed cruiser, a fishing boat or a summer home, for it is equally suited for all of these purposes.

You'll like the Leemon 30-footer. It is the smallest standardized boat ever offered in the popular bridge deck type. It is just big enough to handle with maximum pleasure and minimum expense.

Price Reduced to $2800 without motor, completely equipped, including war tax.

Write today for catalog and full description.

LEEMON BOAT CO., Dept. 5. Cambridge, Maryland

PIERCE-BUDD ENGINES

The Most Celebrated Two Cycle Marine Engines on the Market

HERE is the engine for your speed boat, runabout, cruiser or work boat. A smooth running and reliable power plant that offers you years of dependable service at the lowest possible cost.

The famous Pierce-Budd engines are known the country over for their great efficiency, power, flexibility, economy, light weight and high speed. These engines have held and still hold the World's Records in their class since they were originally introduced in 1909. In the 1921 meet of the M. V. P. B. A. at Peoria the Pierce-Budd 150 cu. in. engine won in both the 150 and the 215 cu. in. classes.

Pierce-Budd engines have made successful and satisfactory boats out of hundreds of craft and have made good in all kinds of service. You will be pleased with the price, as well as the quality of construction and the kind of service you get.

A Decidedly High Quality Engine at a Decidedly Popular Price

(Sizes, One to Six Cylinders)

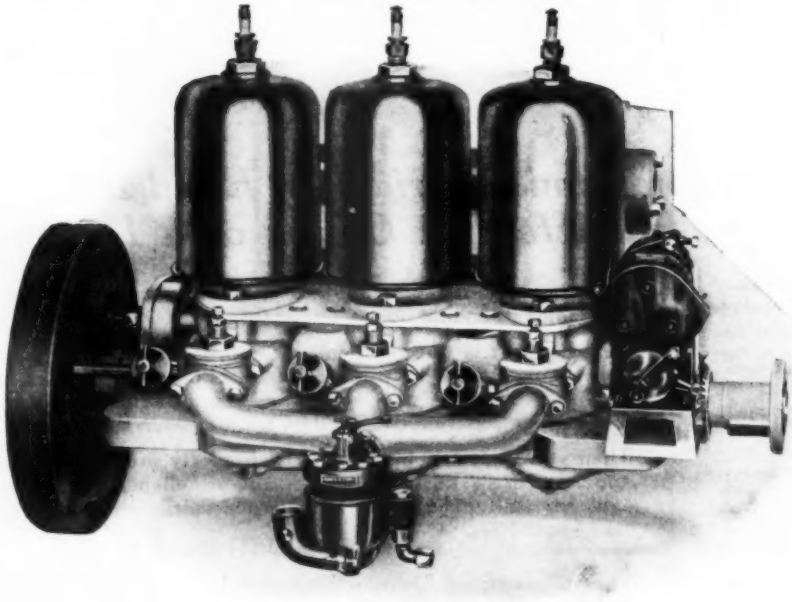
High Speed

Three cyl., 18-25 H. P. Weight 235 Pounds. Speed Range, 500 to 1800 R. P. M.

Aluminum is used for upper and lower halves of base, exhaust and intake manifolds and check valve cases.

Equipment

Bosch Magneto, Rotary Pump, Bronze Bevel Magneto Gears, Internal and Pump Gears. Float Feed Carburetor. Two and Three Port System.



Heavy Duty

Three cyl., 20 H. P. Weight, 360 Pounds. Speed Range, 300 to 1200 R. P. M.

Base and manifolds made of grey iron.

Equipment

Atwater Kent Timer and coil, Rotary Pump, Timer and Pump Gears all machined. Float Feed Carburetors. Three Port System only.

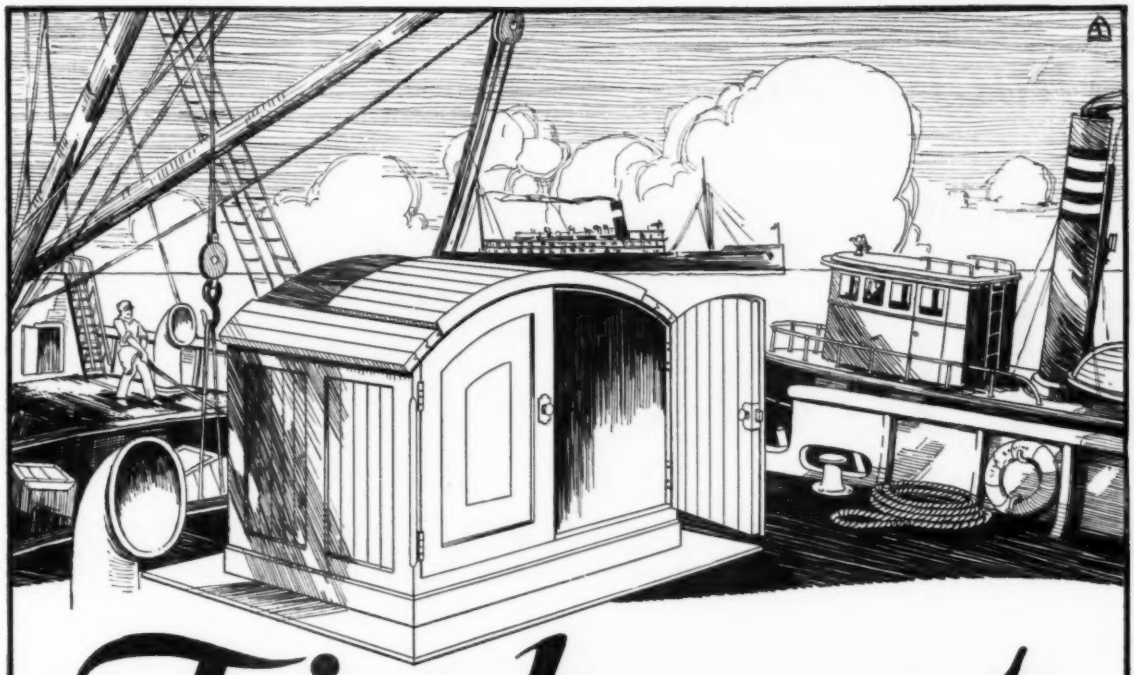
Both the high speed and heavy duty models have removable Brass Water Jackets extending below all ports and cooling the whole length of the cylinders. Best grey iron cylinders, 30-40 pt. carbon steel crankshaft, heat treated and ground to size. Best white metal journal bearings, fitted to a mirror finish. Interchangeable white metal crankpin bearings and interchangeable bronze wrist pin bearings. High grade construction in both workmanship and materials is evident throughout Pierce-Budd engines.

GUARANTEED to develop MORE than their rated horsepower. We guarantee to replace or refund your money on any Pierce-Budd engines returned defective within 30 days.

Write today for full details and prices. Territory open for dealers

J. H. PIERCE, 205 South Raymond Street, Bay City, Mich.

Advertising Index will be found on page 192



Tiebout

The name that symbolizes quality and service in

MARINE HARDWARE

From bow to stern, above-decks and below for ships, workboats, yachts and launches, we carry practically every item needed in brass and galvanized hardware and fittings. Also general supplies.

A chain is only as strong as its weakest link. There is no weak link in the well-balanced, carefully selected *Tiebout* line.

A trial order will make you a steady, satisfied customer.
Try us at once.

Prompt deliveries—reasonable prices.

W. & J. TIEBOUT

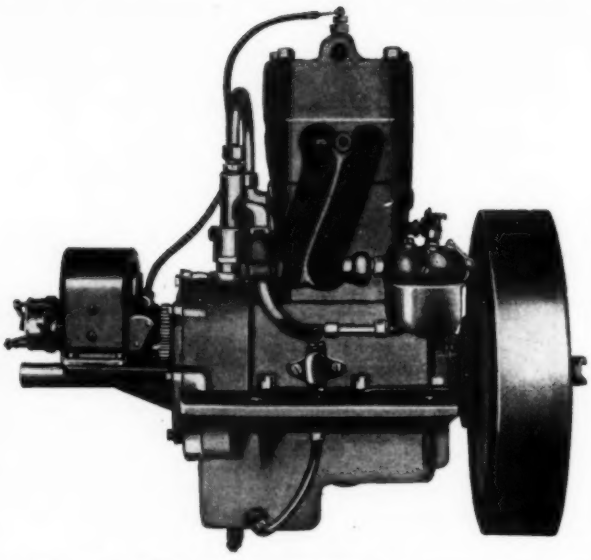
"Locks and Latches for Doors and Hatches"

118 Chambers St. **New York City**

Announcing

the new

HESS



"MONO-MARINE"

Now Manufactured by Hess Motors, Algonac, Mich.

Single Cylinder 4-5 H. P.

Four Cycle Marine and Stationary Equipment

SPECIFICATIONS.

Bore 3¾" *Stroke* 4"

Cylinder. Water jacketed and detachable from crank case.

Crank Case. In two parts, the upper half containing cam shaft, crank shaft, valve tappets, bearings and pumps.

Pump. Plunger style, operated within crank case permitting pump eccentric to run in oil bath. Bronze plunger, cold water packing.

Bearings. Both main and thrust bearings of phosphor bronze.

Valve Tappets. Enclosed and easily adjusted.

Fly Wheel. Unusually heavy, weighing 60 lbs. and measuring 14" in diameter.

Weight. 225 lbs.

Horse Power. 4-5 at 925 R. P. M.

Cylinder Head. Detachable, water jacketed.

Manifold. Hot spot, special design having exhaust and intake cast in one unit, assuring heated fuel being served to the engine, thereby permitting the use of low test petrol and paraffin.

Ignition. Dual Ignition consisting of timer, switch, spark coil and Bosch high tension waterproof magneto.

Carburetor. Kingston. Will idle at 100 R. P. M.

Crank Shaft. Made of 40-50 point carbon steel, counterweighted to effect perfect balance. Main bearings, 1½" diameter.

A HIGH grade four-cycle marine motor suitable for yacht tenders, runabouts, family launches, fishing boats and auxiliaries, as well as for stationary work. We have put excellent materials and workmanship into this engine and still it is so simple that it costs about the same as an ordinary two-cycle engine.

Replacements Everywhere at Low Cost

A very important feature of the HESS Mono-Marine is the fact that all such parts as pistons, piston rings, piston pin, connecting rods, valves, valve springs, timing gear, carburetor and coil points are interchangeable with the same parts used in the Ford motor. This insures quick replacement in any locality and the advantage of this feature is quickly recognized.

New Prices of the HESS MONO-MARINE

Effective January 1, 1922

Equipment T. $130.50 — Mono-Marine Engine, complete with Kingston Carburetor, Spark Plug, Coil, Switch, Timer and Hot Spot Manifold.

Equipment M. T. $150.00 — Same as Equipment T but with Bosch High Tension Waterproof Magneto. Equipment M. T. is the best as it is of the Dual Ignition Type.

Assortment A. K. $25.50 — 8 feet of bronze shafting. One set of flange couplings. Stuffing box. Stern bearing. Propeller.

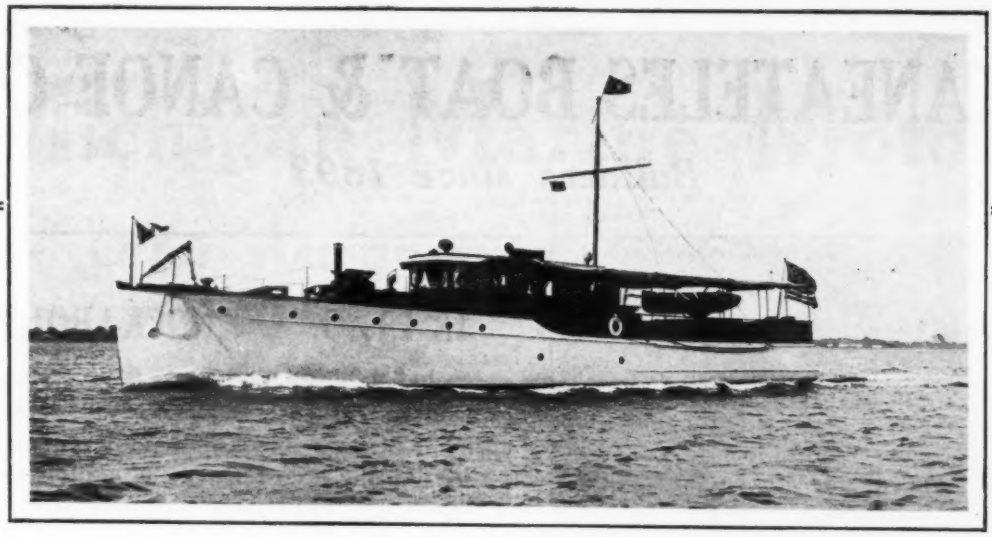
Assortment A. C. $30.00 — Same as assortment A. K. but instead of flange couplings a List One-way Clutch is furnished.

Assortment A. R. $65.00 — Same as assortment A. C. but instead of One-way Clutch a Reverse Gear is furnished.

Write today for catalog

HESS MOTORS, Algonac, Mich.

Advertising Index will be found on page 192



"TOPAZ" "ROAMER"

NOCK BOATS "The Name A Guarantee"

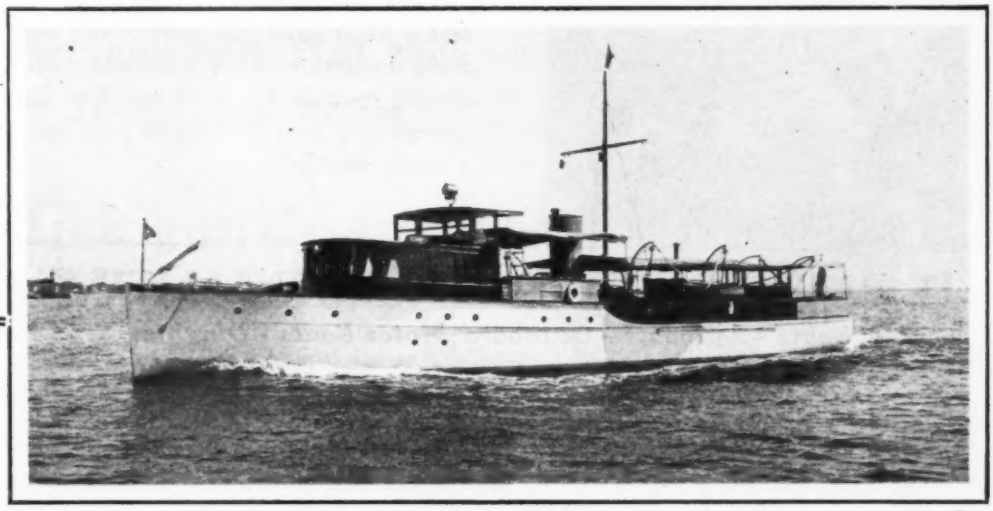
Frederic S. Nock

Naval Architect and Yacht Builder

The character of Nock designs and Nock construction is best shown by the class of yachts produced in this yard. Topaz and Roamer are two recent examples, typical of our productions.

We will be glad to figure on your new boat

EAST GREENWICH RHODE ISLAND



SKANEATELES BOAT & CANOE CO.

Builders since 1893

18 FT. O. A. KNOCKABOUT

Sail area 225 sq. ft. Beam 6′ 9″. Steel centerboard and rudder. Will stand a lot of wind and luffs readily without loosing the jib. Handles as easily as a cat boat. Excellent one design for clubs.

15 FT. CAT BOAT

This is a strongly built, but light cat boat with the conservative sail area of 115 square feet. It is very easily handled. Just the thing for a boy or girl to learn in. In great demand for summer camps.

SAILING SKIFF

Length 16 ft. Beam 4 ft. Sail area 100 sq. ft. Rows very easily and sails fast. Mast slips into galvanized tube. Steel centerboard in enclosed trunk. Strong enough for hard use, but light enough for two persons to pull up on a beach readily.

IT PAYS TO BUY BOATS OF QUALITY

Row Boats - Sailboats - Outboard Motor Boats - Dinghies

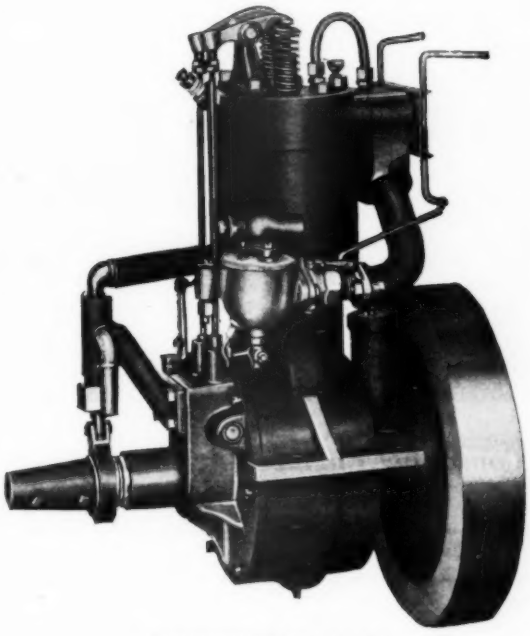
Persons who bought boats of us 15 to 18 years ago keep coming back for duplicates. These orders are receiving the attention of the same men who built our first boats.

GET YOUR ORDER IN EARLY **38 Jordan St., Skaneateles, N. Y., U. S. A.**

Advertising Index will be found on page 192

Michigan Marine Motors

Offer you an extra large measure of Economical Service in the 1922 Product



CARBURETOR SIDE

A demonstration will convince you that this motor stands in a class by itself—for sturdiness, reliability and economy.

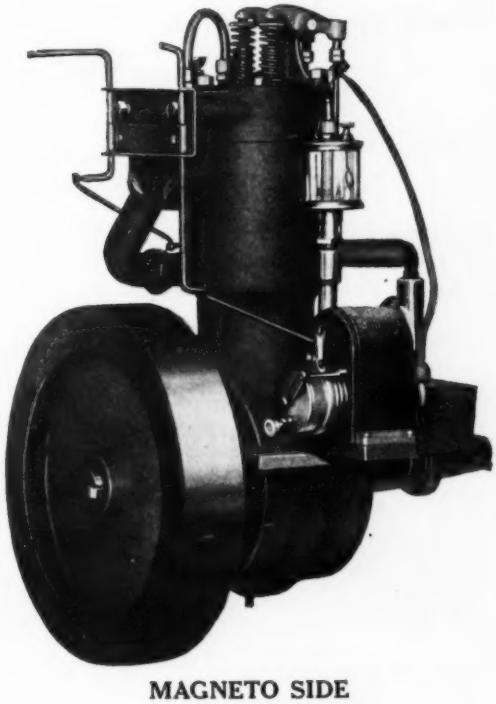
4½ H.P. 4-Cycle. Weight, 125 lbs.

Outfit "A" complete with Bosch Magneto $135.00

Outfit "B" complete with water-proof Timer, Battery & Coil..$115.00

F.O.B. Detroit, Mich.

Many parts of this motor are interchangeable with Ford Motor parts. Repairs at any Ford Service Station.



MAGNETO SIDE

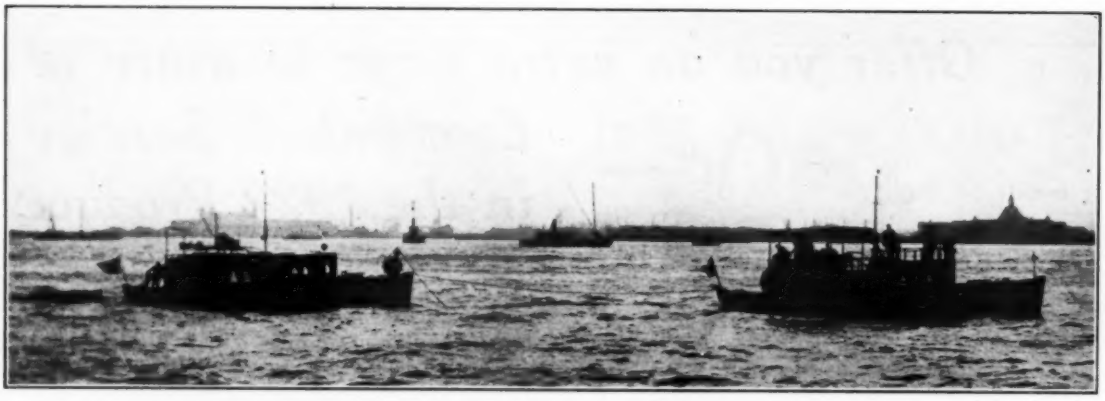
See our Motor at the New York Show

Michigan Marine Motor Corp.

7237 East Jefferson Avenue

Detroit, Mich.

Application of Electricity to Marine Transportation



First Application of Power for Propulsion Distributed by Electricity Between Vessels in Convoy. Yachts "DAWN" and "NEW ERA" Have Cruised over 6,500 miles.

ELECTRICITY afloat leads the way in Safety, Reliability, Comfort and Economy, as applied to day cruisers, yachts, house boats and commercial vessels.

William T. Donnelly, Consulting Engineer
17 Battery Place, N. Y.

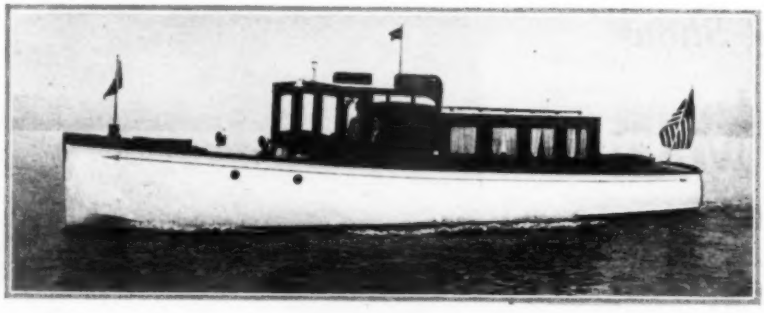
Dawn Boat and Shipbuilding Corporation
Clason Point, New York City

Builders of

POWER BOATS, YACHTS AND WORKING BOATS FOR

The Nonsinkable Electric Cruiser "Lightnin" and the Famous Electric Yachts "Dawn" and "New Era" were built by us.

GASOLINE
DIESEL OR
ELECTRIC DRIVE



"LIGHTNIN." Smallest electric cruiser afloat. Electricity will give you best power for propulsion, clean heat for cooking, bright light at night and will make yachting a pleasure all the time and everywhere you go.

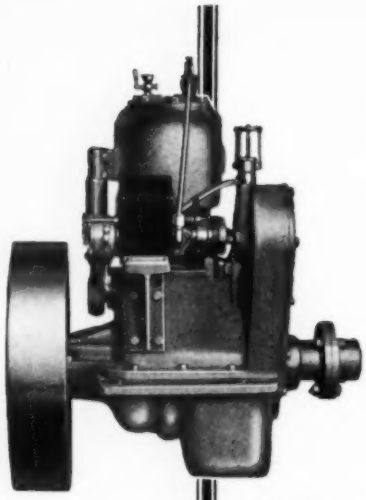
See "Lightnin" at Dawn Boat and Shipbuilding Exhibit at National Motor Boat Show, New York, February 17 to 25.

Advertising Index will be found on page 192

KERMATH

ENGINES
For
1922

The
WORLD'S
STANDARD
MARINE
MOTOR



4 Cycle
1 Cylinder
3 to 4 H. P.

Let Your Next Kermath — The Marine

THE KERMATH marine motors are famous throughout the world. You'll find them operating in the waters of every civilized country under the sun.

The Kermath standard, 4 cycle, 4 cylinder engine is used today by over 80 percent of the leading boat builders of the world as standard equipment. Could you ask for stronger endorsement?

We particularly call your attention to the experienced individual boat owner. He is one of the strongest Kermath boosters. Having tried all types of motors, he finally settles on the Kermath as the only one he can always depend upon under all conditions to serve him 365 days in the year—year in and year out.

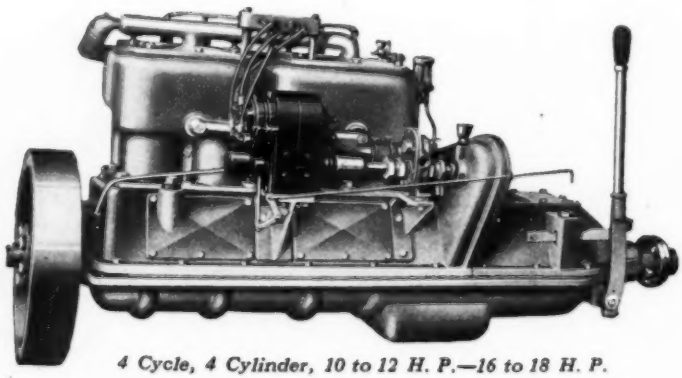
For example, Martin Welch of Winthrop, Mass., writes: "The Vanadium 20 H. P. Kermath which I purchased last May has run continually since installed, covering over one thousand miles without a single skip. Recently ran about seventy-five miles, using only eighteen gallons of gas, and made it in eight hours without a stop. Cannot say too much about the smoothness and efficiency of this engine."

Jay Gould of Lake Geneva, Wisconsin, states: "The 16 H. P. Kermath motor I bought last fall was a dandy. Ran it from Kenosha, Wis. to Mobile, Ala. on only 200 gallons of gas. Didn't even have to clean the spark plugs on the whole trip! This motor was installed in a 26-foot raised deck cruiser!"

John Law Kerr of Useppa Island, Florida, writes: "It may interest you to know that the Kermath that is now installed and is giving such wonderful service, is the same rebuilt engine that you sold me in 1917! It was the pioneer Kermath around here, and has since been sold twice, and is still giving excellent service."

L. W. Kelsay of New York City writes: "I wish to buy a 12 H. P. Kermath to replace one of your engines that has been doing service in my boat since 1911! This is ten years' service this fall. My present engine is still in perfect running order. I cannot speak too highly of this really marvelous marine motor."

Stanley M. Turlington writes: "My 16 H. P. Kermath has been constantly at work since 1919. Four months of this time she ran from 40 to 60 miles per day to the fishing grounds. The other eight months she operated every day on pleasure trips and on top of this during the latter part of 1920, we had her coupled up to a force pump, pumping

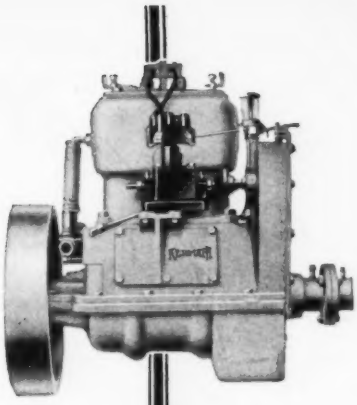


4 Cycle, 4 Cylinder, 10 to 12 H. P.—16 to 18 H. P.

"A Kermath always runs"

Advertising Index will be found on page 192

Motor Be A World's Standard Motor



4 Cycle
2 Cylinder
4 to 5 H. P.
6 to 8 H. P.

piling for a toll bridge. In other words, she has been constantly at work night and day, and we have not had one moment's trouble with her."

A. E. Heilbron of San Antonio, Texas, writes: "The Kermath I purchased from you has measured up in merit in every statement that you made. It is a very energetic, capable motor and eminently reliable, and has given me continuous and uninterrupted service. I cannot speak too highly of it."

And so we could go on. In fact, if space would permit, we could quote hundreds of such letters. The above are merely taken at random from letters that come in daily.

Kermath popularity is due to their reliability under all conditions. Their first cost is very low, and they are very economical to operate. No matter what the conditions, they always run. With good care, they will last for years.

So, if you are about to purchase a new motor, we suggest you investigate the merits of this motor before you place your order.

The latest Kermath success is the 3 H. P. one cylinder engine that sells for only $135 with Bosch Magnetc and impulse coupling. If you operate a smaller boat, this is just the power plant you need—small, compact, very powerful and a regular bear for work.

This is a very popular model, and is selling as rapidly as we can produce them.

Other equally well known Kermath motors are the two cylinder, 4 to 5 H. P. and 6 to 8 H. P. units.

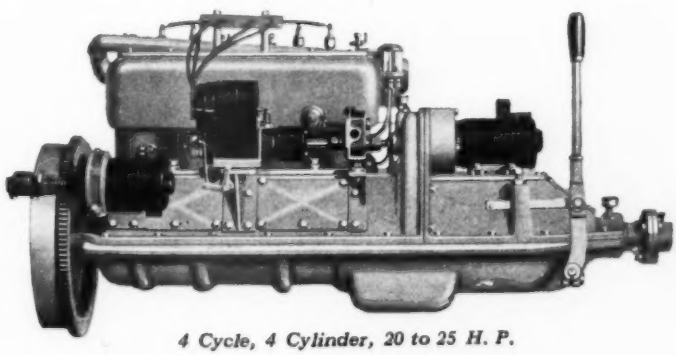
These are for slightly larger boats. They have been standard for years with the leading boat builders of the country.

Then, there are the 12 and 16 H. P. models—still larger, more powerful and very economical, and with the same Kermath stamina and reliability.

The famous Vanadium "20" which runs into still greater horsepower is a very efficient design.

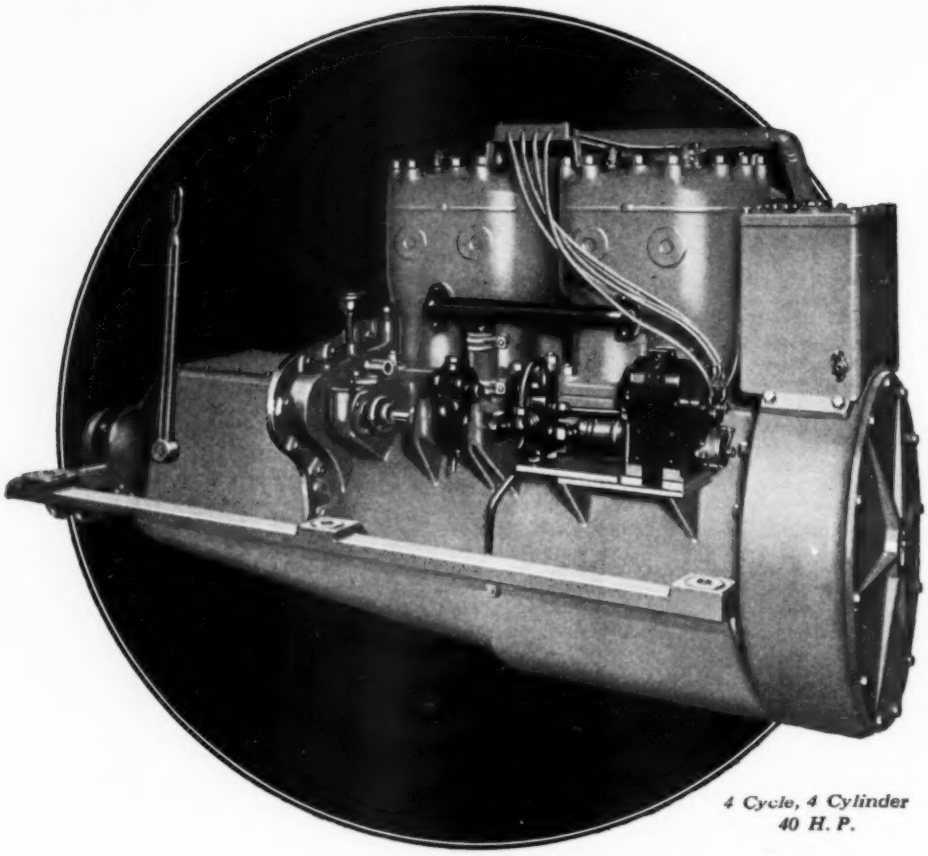
The great Kermath "40" is a giant for work, and is found in many of the best power boats in this country and abroad.

No matter which Kermath model you select, if it is the type that fits your boat, you can be assured of the most efficient service, bulldog staying qualities and economy in operation at all times.



4 Cycle, 4 Cylinder, 20 to 25 H. P.

"A Kermath always runs"



4 Cycle, 4 Cylinder
40 H. P.

Following is the greatly reduced Kermath price list for 1922. We cannot guarantee the length of time these prices will be in effect. But they are in effect now and if you place your order now (spring delivery if you wish) you will save money.

Write us at once for full description and further details of the entire Kermath line.

3 H. P.	$135	16 H. P.	$ 475
4 to 5 H. P.	270	20 H. P.	510
6 to 8 H. P.	290	40 H. P.	1,550
12 H. P.	445		

See the line of Kermath motors at the Motor Boat Show—Block E—Grand Central Palace, New York.

KERMATH M'f'g Co.
DETROIT MICHIGAN.

5880 Commonwealth Avenue

"A Kermath always runs"

Advertising Index will be found on page 192

Vibration

in marine engines Will Be Eliminated by the Engine Makers

WHEN

the purchasers insist upon freedom from this unnecessary annoyance

MOTOR boat enthusiasts who visit our booth (No. 80—second floor) at the Motor Boat Show, in New York, will be given a practical illustration of the advantage of a balanced crankshaft and flywheel.

They will be shown how a crankshaft can be balanced, in the manufacturer's plant, in a few minutes' time, to absolutely eliminate vibration.

Commodore Greening in Rainbow I., twice winner of Fisher-Trophy races.

Commodore HARRY B. GREENING, the original owner of Rainbow I, appreciated the value of freedom from vibration.

Following the winning of the FISHER-TROPHY RACES in Detroit, in 1920, he wrote us:

"I must admit that the balancing on the crankshaft and flywheel of the engine which I used in the 'Rainbow' was an excellent piece of work. Everyone who has ridden in Rainbow remarks on the absolute absence of vibration.

"I suppose you have heard that she won the Fisher-Trophy races this year, and I must admit that the engine ran magnificently and absolutely without tremor."

The NWA Balancing Machine will enable any marine engine manufacturer to accurately balance crankshafts and flywheels.

The cost of balancing, even with a small output, is ridiculously low.

Write for new booklet "Eliminating Vibrations."

VIBRATION SPECIALTY COMPANY

N. W. Akimoff, President

Harrison Building **Philadelphia, Pa.**

WE SOLVE VIBRATION PROBLEMS NWA Trade Mark Registered

MoToR BoatinG Books for Boatmen

All Published by MoToR BoatinG—All Non-Technical and Authoritative

MOTOR BOATING PRACTICAL HANDBOOKS—6 VOLUMES

Volume I —Practical Motor Boats and Their Equipment.....$1.50
Volume II —Practical Motor Boat Building..... 1.50
Volume III—Practical Things Motor Boatmen Should Know..... 1.50
Volume IV—Practical Marine Motors..... 1.50
Volume V —Practical Motor Operation and Maintenance..... 1.50
Volume VI—Practical Suggestions for Handling, Fitting Out and Caring for the Boat..... 1.50

The books measure 7 x 10 inches and are handsomely bound in cloth. Over 1,000 pages. Price of Practical Handbooks $1.50 per volume or $7.50 per set of Six Volumes.
Send for circular completely describing these books.

Foreign postage: $1.00 extra

THE IDEAL SERIES

Volume I—Designs of Ideal Motor Boats and How to Design a Motor Boat.....$2.00

This volume describes in detail how to design a motor boat. It also contains complete plans of 30 Cruisers, Runabouts and Auxiliaries. The plans include lines, table of offsets, interior plans, profiles, construction details, etc. There is no book published at the present time which describes in everyday language the details of designing a boat according to your own tastes. The plans of Ideal Cruisers, Runabouts and Auxiliaries are complete in every particular. They include the best of the plans published in MoToR BoatinG during the past several years. The plans include boats of from 20 feet in length up to 40 feet. The drawings are all to scale and large size.

Volume II—How to Build Sixteen Ideal Motor Boats $2.00

This book gives complete information for building the following boats:

10-foot mark boat, 12-foot outboard motor boat, 12-foot speed boat, 12-foot bangabout, 13-foot sea skiff, 16-foot sharpie, 18-foot runabout, 20-foot monoplane, 20-foot hydro-runabout, 20-foot knockabout, 20-foot tunnel stern, 22-foot V-bottom runabout, 25-foot V-bottom cruiser, 25-foot round-bottom cruiser, 28-foot cruiser (Consort II).

Every article is fully illustrated with working drawings and no information or instructions are missing which would be of assistance to the novice to build his own boat.

Both of the Ideal Books are printed in large type on extra fine paper. They have been edited by Charles F. Chapman, editor of MoToR BoatinG.

Price of Ideal Books, $2.00 per volume or $5.00 per set of 3 volumes.

Foreign postage: 50c

Ideal Series, Vol. 3
Twelve Complete V-Bottom Designs
by William H. Hand, Jr.

Plans Prepared Expressly for MoToR BoatinG

This new book is the most valuable ever published for the amateur builder or anyone desiring to have a V-bottom boat built by his own builder.

The plans contain outboard profile, lines, inboard, construction and interior arrangement plans, sectional views and complete table of offsets. Accompanying each design is a description of the boat and a full set of specifications taking up step by step each feature of the boat's construction, how it should be built and the proper material to use.

Plans and specifications of the following boats are included: **Edith, a 15-foot runabout; Jane, an 18-foot runabout; Katharine, a 30-foot cruiser; Dorothy, a 25-foot runabout; Zenith, a 25-foot cruiser; Cyclone, a 36-foot auxiliary; Eclipse, a 40-foot express cruiser; Magnet, a 28-foot cruiser; Tornado, a 45-foot auxiliary schooner; Broncho, a 29-foot cruising runabout; Shark, a 21-foot utility runabout; Claire, a 36-foot express cruiser.**

Price of Twelve Complete V-Bottom Designs . $2.00

(If ordered with the 2 other volumes of the Ideal Series, the price of the 3 books will be $5.00.)

Twenty Easy-to-Build Motor Boats

A New Book of Small-Boat Plans and How to Build Them

Volume IV Ideal Series

By William J. Deed and others

America's Foremost Small-Boat Designers

(Ready Now)

These plans have been prepared especially for MoToR BoatinG and are complete in every particular. They are in detail enough to permit building from direct, either by the amateur or professional builder. No part of the boat's design or construction has been omitted or slighted.

Read the contents: Chum, a 16-foot Motor and Sail Craft; a 9-foot Easy-to-Build Dinghy; Nomad, a 34-foot Cruiser; a 9-foot Sharpie; Porpoise, a 20-foot Auxiliary Cat Boat; Kingfisher, a 14-foot Fishing Skiff; Shrimp, a 25-foot Hampton Boat; Flattie, a 16-foot Utility Boat; Dolphin, a 34-foot Tunnel Stern Cruiser; a 9-foot Dory; an 8-foot V-Bottom Tender; Penguin, a 25-foot Auxiliary Sloop; Sea Gull, a 41-foot Auxiliary Schooner; Whale, a 20-foot Cruiser that's a Real Cruiser; Tarpon, a 29-foot Raised Deck Cruiser; Alligator, a 28-foot Tunnel Stern Cruiser, a boat that will run in water little deeper than a heavy dew and Mud Turtle, a 36-foot Stern Wheel Motor Boat. Rookie, a 20-foot Auxiliary Sloop; Nautilus, a 40-foot Tunnel Stern House Boat; Victory II, the Cruising Champion; Complete Bills of Material for Building.

Book is printed in large type, on fine paper, and handsomely bound in cloth.

Price of Twenty Easy-to-Build Motor Boats.. $2.00

If ordered with other three books of Ideal Series, price of all four books..... $6.00

Prices for all books of Practical Series, Ideal Series and V-Bottom Designs. Ten books in all.

If Purchased Separately.....$17.00 If ordered all at one time.....$12.00

All Books, 36 charts, log sheets and binder. Ordered together $16.00

Foreign Postage $1.50 extra.

(See advertisement of charts and log book elsewhere in this issue)

MoToR BoatinG, 119 West 40th Street, New York

Advertising Index will be found on page 192

Richardson BOATS

SCOUT—Standardized 26-Footer

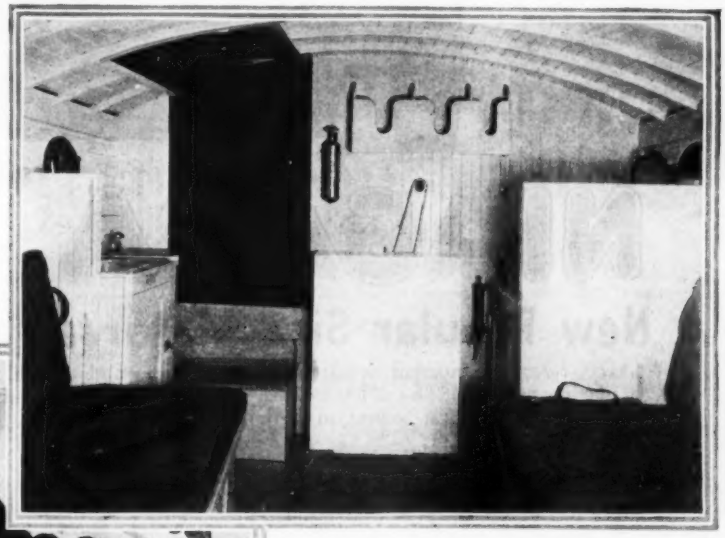
YOU'LL never know all the fun and comfort that can be crammed into a 26 foot cruiser until you have seen SCOUT. It's a real boat, the most complete 26-footer ever built. The ideal family cruiser, the ideal boat for week end parties, for a summer home on the water, for Florida cruising. The speed of 9-10 miles per hour means an interesting trip, wherever you cruise.

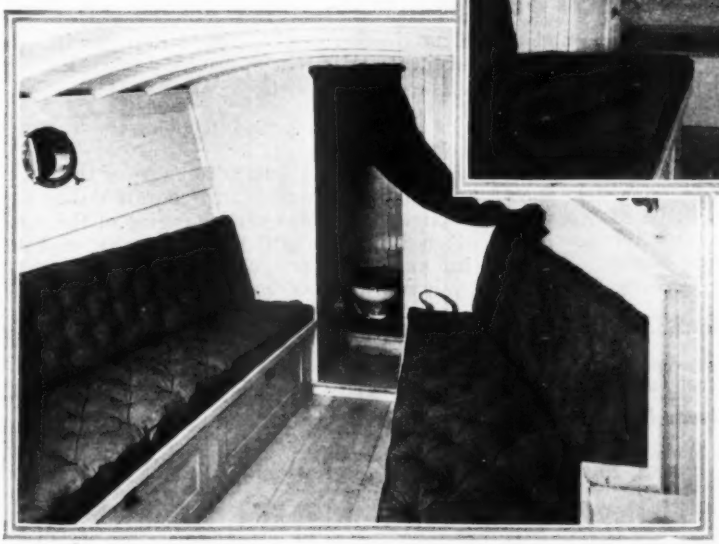
SCOUT is a handsome little ship, sturdy and seaworthy, well designed and excellently constructed. Its accommodations are unusually complete and free from crowding. It meets every requirement for a party of four on an extended cruise. For day trips there's room aplenty for eight or ten.

SCOUT is easy to handle, economical to run and simple to maintain. It is furnished with complete cruising equipment and a good motor so the price covers your entire outlay for the season, except gas and oil.

26′ x 8′ 6″ x 2′ 6″ large cockpit. Roomy cabin with toilet, galley, and berths for four. Full headroom. 4 cycle 12 H. P. motor with reverse gear. Speed 9-10 M. P. H.

Price $2,500 complete.





Write today for complete specifications and plans. SCOUT will open your eyes to the possibilities within 26 feet. Arrangements must be made soon if you want spring delivery.

Richardson Boat Company

370 Sweeney Street, North Tonawanda New York

We also furnish K. D. frames and complete boats in any size, runabouts or cruisers. Let us quote prices.

Back to "Normalcy"

NIAGARA "SPECIAL"

A New Popular Size Motor at a New Popular Price

THE return to normal demands, normal prices and normal production costs means a new era in marine motors. The NIAGARA "Special" is a wonderful little engine that has quickly taken its place as one of the best selling, most popular marine power plants ever announced.

NIAGARA "Special" is a highly refined four cylinder unit power plant suitable for ALL OPEN BOATS, for SPEED RUNABOUTS, for all kinds of COMMERCIAL BOATS, and for CRUISERS up to 30 or 32 ft. It means a new kind of power service for owners of SMALL and MEDIUM size craft,—better economy, smoother operation, less vibration, greater flexibility, easier starting, less trouble, lower maintenance cost.

This engine possesses all the advantages of the larger four cylinder motors. And it costs no more than any well built single or double cylinder engine of the same power. It is built for hard marine service, and develops its rated power continuously under load whether you run it at 500 or 1800 R.P.M.

Prices $235 to $330 Complete with Equipment

Let us send you the details and specifications of NIAGARA "Special" and its equipment. Its quality, value and price appeal alike to the boat owner, the boat builder and the engine dealer. Write today.

Agency Allotments Now Being Made. Don't Delay.

Other Niagara Models. For all types and sizes of boats.
2 cyl., 4 cyl., 6 cyl., 8 cyl., 5-14, 20-35, 35-60, 60-120, 80-180 Horsepower

NIAGARA MOTORS CORPORATION, 206 Niagara Boulevard, Dunkirk, N.Y.

Advertising Index will be found on page 192

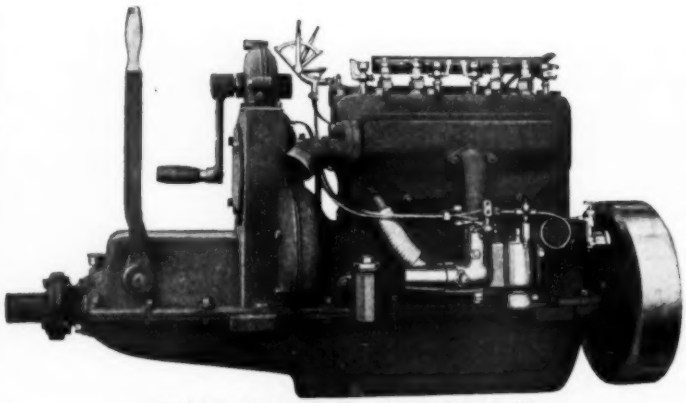
WITH reverse gears, as with all other products, experience is the greatest teacher.

¶ The combined experience of more than Thirty prominent Marine Engine Manufacturers has led each of them to standardize on one Reverse Gear. Thereby they have slightly added to their total manufacturing costs, but tremendously increased the dependability of their complete units.

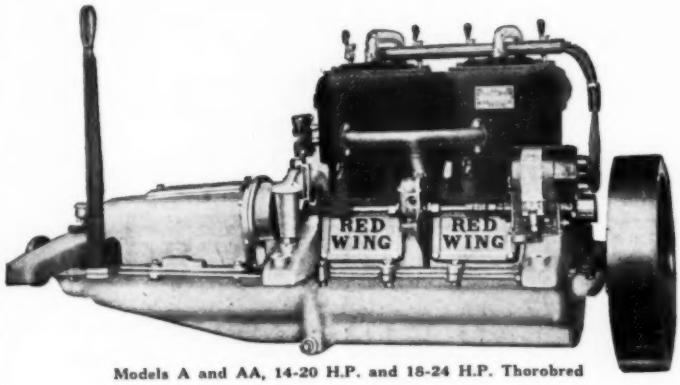
¶ YOUR boat should be equipt with this dependable gear to be safe.

(Continued on page 191)

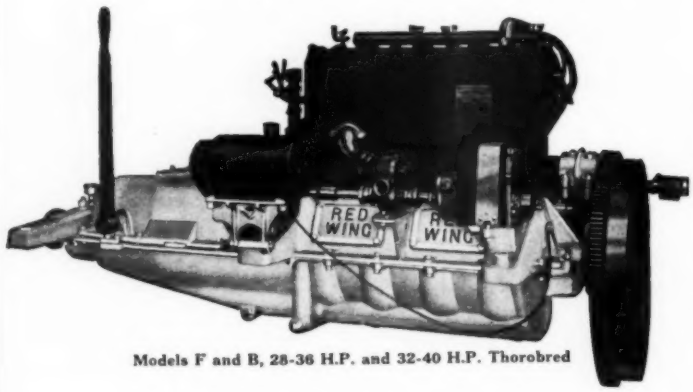
Red Wing Thorobred
THE MOTOR WITH POWER TO SPARE



Model D 10-14 H.P. Thorobred "Baby Doll"



Models A and AA, 14-20 H.P. and 18-24 H.P. Thorobred



Models F and B, 28-36 H.P. and 32-40 H.P. Thorobred

At Least Investigate!

IF you are contemplating the purchase of a marine engine for any service, be it a "dink" or a twin motored cruiser or houseboat, in fairness to yourself and your future satisfaction, investigate the Red Wing Thorobred line before you buy. It may mean the difference between the Failure and Success of your boat. A good motor means everything. Nor need you spend a fortune to have it.

Write us for information and prices on our five sizes, 10 to 40 H.P.; at least, INVESTIGATE! We gladly submit the Thorobred to any and all comparisons.

RED WING MOTOR CO.

Dept. B. RED WING, MINN., U.S.A.

Eastern Distributors: Verrier, Eddy Co., 222 E. 42nd St., New York, N. Y.; W. H. Moreton Corp., 780 Commonwealth Ave., Boston, Mass.; W. E. Gochenaur Mfg. Co., 631 Arch St., Philadelphia, Pa.; Hutchinson Bros., Alexandria Bay, N. Y.

Our exhibit will be in Block C New York National Motor Boat Show, February 17th to 25th

Advertising Index will be found on page 192

Just Out!

Write today for your copy of the newest Willis catalog of marine supplies. Mailed free upon receipt of your request by letter, card or phone

Except where specified we ship immediately from stock anything listed in this catalog.

THIS catalog lists, illustrates and describes thousands of items of motor boat equipment, with new low Net Prices. It is interesting and invaluable to every boat owner, marine dealer and builder. You should have a late copy always at hand.

We are the largest mail order dealers and jobbers of motor boat supplies, accessories and marine hardware. We offer you the same low prices and prompt service by mail that you would get if you could call at our store.

Quantity purchases and long experience in this business enable us to quote you the lowest prices consistent with quality.

Write to 85 Chambers St., New York, or phone Worth 3624 for the catalog.

Ready February 15, 1922

The Greatest Motor Boating Book Ever Published

Piloting, Seamanship and Small Boat Handling

By CHARLES F. CHAPMAN

MoToR BoatinG's Correspondence Course

COMPLETE IN BOOK FORM

Profusely Illustrated with Nearly 300 Cuts and Diagrams

QUESTIONS AND PROBLEMS ON ALL PHASES OF BOATING

Correct Answers to the Questions and Problems to be issued in an addenda which will be sent later to each purchaser of the book.

MoToR BoatinG's Ideal Series Volume V

PRICE $2.00

Edition is limited, so orders should be placed early

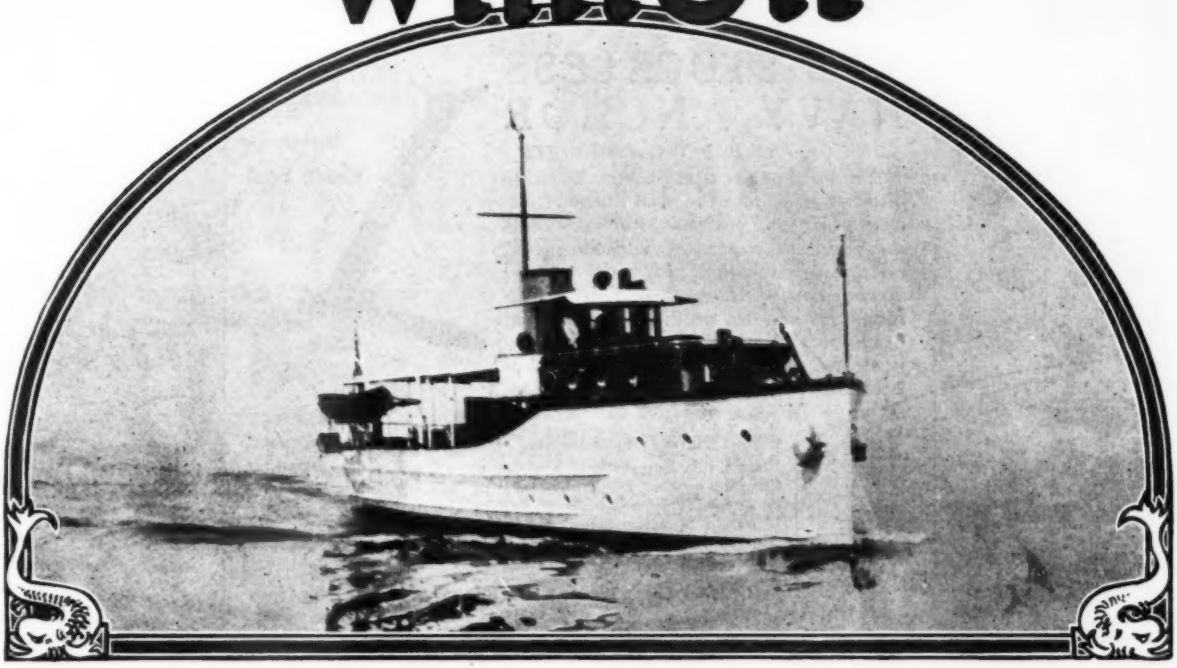
MOTOR BOATING

119 West 40th Street, New York

NOTE—See advertisement elsewhere in this issue describing other books of The Ideal Series

Advertising Index will be found on page 192

Winton



"Hopestill," Mr. C. W. Wiley's splendid yacht, the finest in appointment of any cruising yacht on the Pacific Coast. Main power plant consists of two 80 h.p. type W6 Winton Gasoline Marine Engines. Cruising speed 14 m.p.h. Auxiliary equipment includes 3 k.w. electric generating set driven by Winton gasoline engine.

DISCERNING yachtsmen can well study the record already made by the Winton Marine Gasoline Engines in the *"Hopestill."* These engines were the choice of an owner whose long experience in ship building and as a yachtsman inevitably led him to the Winton as correct power for his own yacht.

These engines were installed in Charleston, N. C., and the *Hopestill* immediately embarked upon the long voyage to Seattle. She made, according to the engineer's log, 6,700 miles on 6,300 gallons of gasoline. The run from Charleston to San Diego was made in 27 days, the engines performing perfectly. Through heavy weather and fair she kept to a steady schedule. From Balboa to Acapulco, 1,498 miles, the distance was covered in 7½ days without stopping the engines, and during the long 6,700-mile run the only stops made were upon signal from the pilot house.

With such a record on her trial run it is not strange that the owner feels, as do hundreds of Winton owners, that he has indeed found an ideal power plant.

WINTON ENGINE WORKS

CLEVELAND **OHIO, U. S. A.**

New York—A. G. Griese, Inc., 30 Church Street **San Francisco—F. G. Bryant, 593 Market Street**
Seattle—H. W. Starret, Sunset Engine Company **Jacksonville, Fla.—D. J. Garrison & Company**
Washington, D. C.—R. L. Fryer, 817 Albee Bldg.

© 1921, Rex W. Wadman, Inc.

WC STOCKLESS' NAVY ANCHOR

ONE OF THE 1001 **WC** *PRODUCTS*

Takes hold at the first pull of the cable and hangs on like the well known bulldog. Tripping fin absolutely prevents dragging flukes up. One-piece head; no mud-gathering pockets. Solid wrought iron shank; free from "pinhole." Lies in holding position at angle of 55° to flukes, per Navy specifications. Heavily galvanized by hot process. Proper shackle furnished. At your dealer's, or write us.

Bites Instantly Can't Foul

GET THIS BOOK of Helpful Hints for BOAT OWNERS

"Sea Craft Suggestions and Supplies" solves those daily "puzzlers" that few know how to handle. Tells how to Box the Compass; what is Proper Ground Tackle; gives hints on Steering Gear, etc.; describes WC Dependable Marine Hardware; tells uses. Compiled from 75 years' experience in making marine fittings. **50c** prepaid.

WILCOX, CRITTENDEN & CO., INC. (Est. 1847)

4 SOUTH MAIN STREET **MIDDLETOWN, CONN.**

Visit Space 108 at the New York Motor Boat Show

"The Capitol"

A Marine Unit Power Plant

For Speed Runabouts and High Class Cruisers

Dash instrument and switch plate controlling ignition, lights, ammeter, oil gauge and dash lights

COMPLETELY ENCLOSED—COMPLETELY EQUIPPED

FROM the first glance the Capitol inspires the confidence of marine engine buyers. Its clean cut, well proportioned exterior with every moving part enclosed and every accessory built in immediately suggests the fact that it is the product of master designers. There isn't a smoother, quieter running marine engine. Vibration and noise are eliminated by perfect balance of moving parts, wide-faced helical-cut timing gears, force feed lubrication, ball bearing universal joint, three point suspension, and many other improvements over ordinary construction.

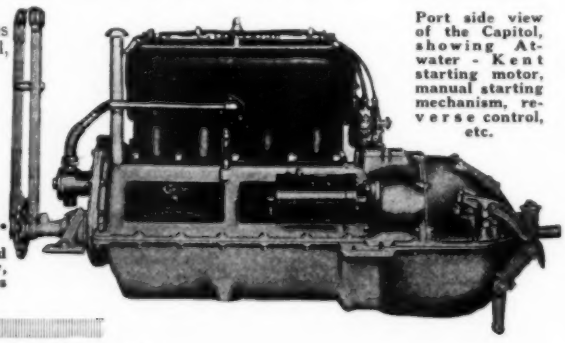
Highest Grade Equipment

Delco ignition, Atwater-Kent two-unit starting, lighting and generating system, Willard storage battery, Stromberg or Schebler carburetor, instrument plate shown above and all other necessary equipments are included.

If you own or are planning the kind of a runabout or cruiser that deserves a really excellent power plant, you should know more about the Capitol, its special features of construction and how it is built.

Bore 4¼″	**Stroke 5½″**
High Speed Model	**60-65 H. P. at 2000 R. P. M.**
Medium Speed Model	**30-34 H. P. at 1000 R. P. M.**

Write today for complete description and prices



Port side view of the Capitol, showing Atwater - Kent starting motor, manual starting mechanism, reverse control, etc.

Auto Engine Works, St. Paul, Minn., U.S.A.

Eastern Representatives: Ventnor Boat Works, Atlantic City, N. J.; Fred C. Duclon, Alexandria Bay, Jefferson Co., N. Y.; Gray-Aldrich Company, Inc., 84 Atlantic Ave., Boston, Mass. Canada: The A. R. Williams Machinery Company, Limited, 64-66 Front St. W., Toronto, Ont.

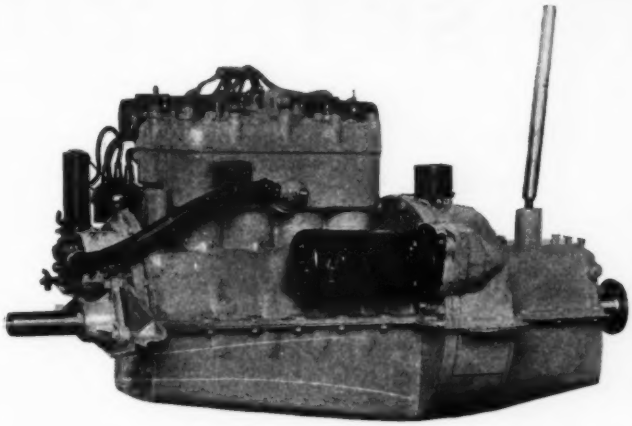
Advertising Index will be found on page 192

Announcing
a new

Doman Marine Motor

4 cylinder 3⅛ by 4½
15-18 H. P.

Doman Engines Made in Sizes
4 to 50 H. P.



FIRST COST is not the proper basis for figuring Cost of Ownership

IT is not what you pay for a motor that measures your satisfaction in your purchase, but what you get.

The operation of purchasing is usually brief, often painless but whether it has been a wise purchase time alone can tell.

The Doman L.M-4 we believe possesses those qualities which reveal their value in ever increasing ratio as time goes on. We believe it to be the most economical engine to operate of any engine of its approximate size in the world. Back of our belief is the report of comparative tests made by the State University of Nebraska.

Economy of operation is a prime factor in Cost of Ownership.

The Doman L.M-4 is properly balanced in its reciprocating parts and is closely governed giving smoothness of operation that makes you happy to run it and adds to its longevity.

Another factor of importance in the final Cost of Ownership.

A careful comparison of the size of bearings, crankshaft and the high standard of ignition, carburetor and other accessories will quickly convince you that nothing has been overlooked that would increase your safety and final satisfaction of Ownership.

Satisfaction of Ownership is Proof of a Wise Purchase.

Doman Marine Engines have served well their owners for 28 years.

Write for complete descriptive folder.

Universal Products Co.

Doman Engine Division

Oshkosh, Wis.

DEALERS—Territory now being allotted

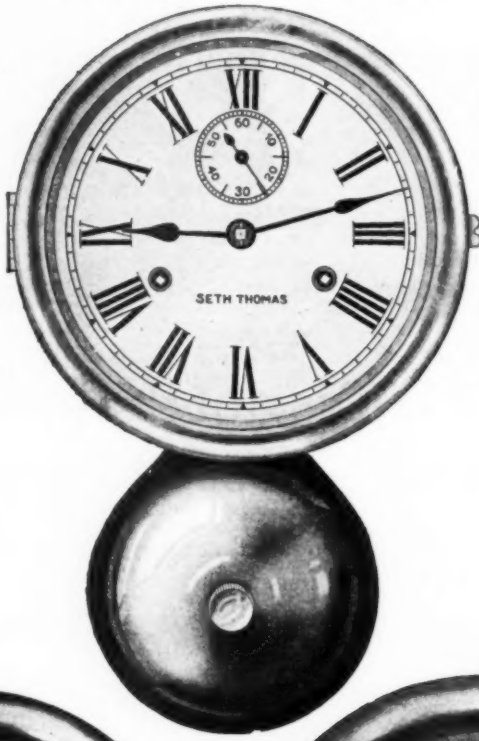
SETH THOMAS
MARINE CLOCKS

There Are None Better

Ship's Bell

Metal Case, Polished Brass or Nickel-Plated. Six-inch Silvered Dial, Hinged Bezel.

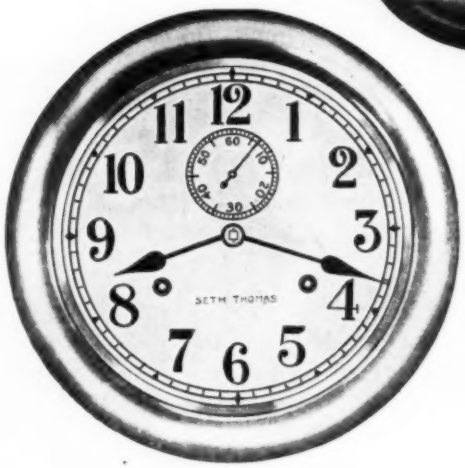
Height 10½ inches



Striking "Eight Bells" same as they are rung on board ship. These are called one-day movements, but will run for about three days. Are strong and simple in construction and do not easily get out of order.

Wood Back. List Price, **$18.50**

Four-Jewel Movement and Metal Back Case. List Price, **$22.00**



BOAT CLOCK

Striking "Eight Bells" as they are rung on board ship. One-day movement.

Heavy Gauge Spun Brass Case, Flange Front and Back, Hinge Bezel. Six-inch Silvered Dial. Brass or Nickel-Plated.

Width 7 inches

List Price, **$18.50**

HIGHEST GRADE METAL LEVERS

8 Day, 7-Jeweled movements of finest quality, in heavy cast brass cases, with silvered dials.

Used in large numbers by U. S. Navy and U. S. Shipping Board. Brass and Nickel-Plated.

No. 3, 3¾-inch dial, screw bezel case. List Price, **$35.00.**
No. 4, 4½-inch dial, screw bezel case. List Price, **$40.00.**
No. 6, 6 -inch dial, screw bezel case. List Price, **$45.00.**
No. 80, 8½-inch dial, hinge bezel case with padlock and key. List Price, **$65.00**

Suitable for Home, Clubs, Steamships, Boats of all kinds, for gifts, etc., etc. You can obtain of your Jeweler full information of our complete line of highest grade 8-day jeweled time and 8-day jeweled ship's striking clocks in various types of wood and metal cases, also of medium grade time and ship's strike clocks.

SETH THOMAS CLOCK CO.

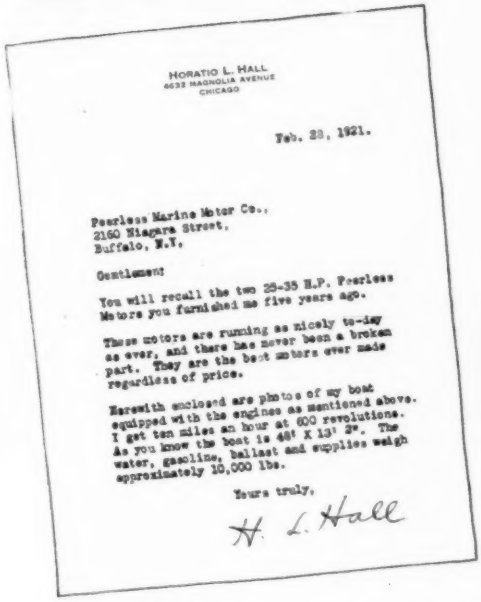
Reliable Clock Manufacturers Since 1813

RK **CHICAGO** **SAN FRANCISCO**

Advertising Index will be found on page 192

Peerless

"The Engine that Makes Good"



HORATIO L. HALL
4632 MAGNOLIA AVENUE
CHICAGO

Feb. 28, 1921.

Peerless Marine Motor Co.,
2160 Niagara Street,
Buffalo, N.Y.

Gentlemen:

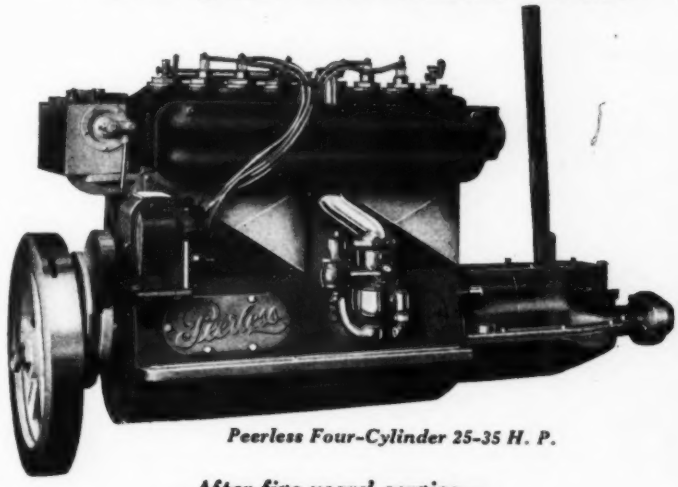
You will recall the two 25-35 H.P. Peerless Motors you furnished me five years ago.

These motors are running as nicely to-day as ever, and there has never been a broken part. They are the best motors ever made regardless of price.

Herewith enclosed are photos of my boat equipped with the engines as mentioned above. I get ten miles an hour at 600 revolutions. As you know the boat is 46' X 13' 2". The water, gasoline, ballast and supplies weigh approximately 10,000 lbs.

Yours truly,

H. L. Hall



Peerless Four-Cylinder 25-35 H. P.

After five years' service—
"They are the best motors ever made, regardless of price"

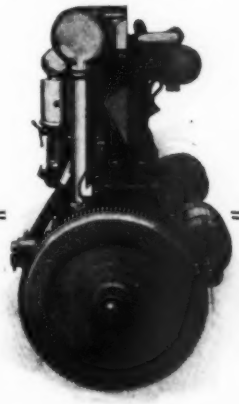
BRAND new owners are apt to be a bit enthusiastic about their motors and their boats. But when a man has shipped with the same motors five years, his opinion is a product of actual experience, a statement worth its face value. It takes a mighty good engine to please a man day after day for five years.

Peerless Marine Motors have a habit of making good and pleasing their owners. Not only that but they give the kind of service that makes boating a real pleasure or a profitable occupation, according to the type of boat you own.

These motors have proved it isn't necessary to pay a fancy price to get a satisfactory power plant. You may pay more or pay less, but you can't get greater value for your money.

The regular Peerless line includes motors from 5 to 50 H. P. built for medium and heavy duty, and suited to all types of boats. You will find them in classy speed runabouts, in big attractive cruisers and hard working fish boats.

Let us tell you the size, power, dimensions and price of the Peerless that is most suitable for your boat. If you are buying an engine this year you owe it to yourself to consider a Peerless



Write today for latest catalog, giving dimensions and details of your boat.

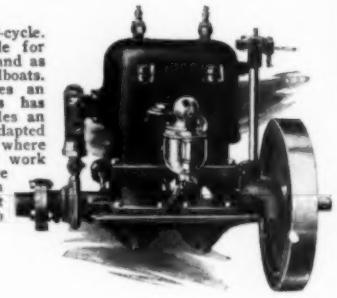
Peerless Marine Motor Corporation

2160 Niagara Street **Buffalo, N. Y.**

The New High Speed Light Weight Peerless Motors

A year ago we added this high speed line, and it found instant favor with owners of fast boats. The lightest weight marine motors on the market, good for speeds of 25 to 45 miles per hour. Special castings and alloy steels give great strength with minimum weight. Speed 1650 R. P. M.

4 cyl. 125 H.P. Weight complete 700 lbs.
8 cyl. 250 H.P. V type. Weight complete 900 lbs.
12 cyl. 400 H.P. V type. Weight complete 1100 lbs.
Write for complete specifications and prices.



Model 68, 2-cylinder, 2-cycle. The 6 H.P. is suitable for boats of 15 to 24 feet, and as auxiliary power for sailboats. Delivers 6 to 11 miles an hour. In hydroplanes has done as high as 18 miles an hour. The 8 H.P. is adapted to the same purposes, where more speed or heavier work is required. In pleasure or work boats of from 20 to 30 feet length, it will deliver from 8 to 15 miles an hour.

For the Small Power Boat —the L-A 2-Cycle Engines

EVERY essential for ideal small boat power is embodied in Lockwood-Ash two-cycle engines—Models 24 and 68.

The principle of the two-cycle engine, as developed by Lockwood-Ash in these models, makes possible abundant power with only three interior moving parts—the piston, connecting rod and crankshaft — under strain. Such parts as valve tappets, cams and crankshafts, gears and chains, with their attendant difficulties, are entirely eliminated.

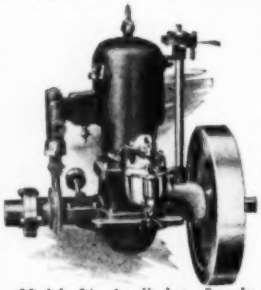
The simplicity of these L-A models—the fewer number of parts used in their construction—means lighter weight and better balance, lower first cost and lower upkeep. It allows the use of a very simple lubricating system—mixing the oil with gasoline. It means long, uninterrupted service—the elimination of petty engine troubles—freedom from breakdowns with their resulting loss of time.

L-A two-cycle engines may be reversed or run in either direction without the necessity of reverse gears. Reverse may be obtained by starting the engine in the direction it is desired to be run—or by reversing upon its own power.

Absence of complication—freedom from strain upon moving parts—makes for more even power distribution. A steady flow of dependable power is provided under all conditions—twice the ordinary number of power strokes are delivered at every revolution of the flywheel.

Valves are so constructed that they are not subject to heat—never require grinding or readjustment—are not subject to carbon adhesion.

To the expert engine man and to the amateur alike, L-A Models 24 and 68 commend themselves for their simplicity, their light weight, their easy starting and their absolute reliability in operation.



Model 24, 1-cylinder, 2-cycle. The 2½ H.P. for boats 14 to 18 feet long, delivers 6 to 8 miles an hour. The 4 H.P. for 16 to 20 foot boats, from 6 to 9 miles an hour.

Prices range from $78.89 to $144.08. Write for complete description and specifications. Convince yourself that L-A two-cycle engines are suited to every need for ideal small boat power.

Lockwood-Ash Motor Co.
2207 JACKSON STREET
JACKSON, MICH.

LOCKWOOD-ASH
MARINE LA ENGINES

Motor Boatmen's Charts and Log Sheets

Published by MoToR BoatinG
119 West 40th St., New York

Charts printed on heavy cardboard 8½" x 11" and punched to fit standard loose leaf folder.

Contain name and location of all principal ports and harbors, distances, compass courses and sailing directions. Invaluable for use on small boats and motor yachts. The set now includes the following charts:

Series A

No. 1—Western End of Long Island Sound.
No. 2—Eastern End of Long Island Sound.
No. 3—Block Island Sound.
No. 4—New York Harbor.
No. 5—Boston Harbor.
No. 6—Buzzards Bay.
No. 7—Block Island to Vineyard Sound, including Narragansett Bay.
No. 8—Delaware Bay.
No. 9—Chesapeake Bay, Part I, Upper Part.
No. 10—Coast of Maine, Portland to Rockland.
No. 11—Hudson River, Kingston to Albany.
No. 12—Chesapeake Bay, Part II, Central Part.

Series B

No. 13—Lake Erie—Eastern Part.
No. 14—Lake Erie—Western Part.
No. 15—Hudson River, New York to Kingston.
No. 16—Lake Champlain.
No. 17—Erie Barge Canal.
No. 18—Massachusetts Coast.
No. 19—New England—Newburyport to Portland.
No. 20—Cape Cod Bay.
No. 21—Maine, Monhegan to Eastport.
No. 22—Chesapeake Bay, Part III, Lower Part.
No. 23—Biscayne Bay.
No. 24—St. Lawrence River and Thousand Islands.

Motor Boating's New Charts—Series C

The third series of MoToR BoatinG's popular charts begins with No. 25, which covers the Delaware River from Trenton to Philadelphia. Others in this series which follow will complete the route to the sea via the Delaware River as well as cover many interesting stretches of cruising waters on the way south and along the coast. It is planned to issue these about as listed below:

No. 25 Nov., 1921..Delaware River, Trenton to Philadelphia.
No. 26 Dec., 1921..Delaware River, Philadelphia to Smyrna.
No. 27 Jan., 1922..New Jersey Coast, Cape May to Little Egg Inlet.
No. 28 Feb., 1922..New Jersey Coast, Little Egg to Barnegat Inlet.
No. 29 March, 1922.New Jersey Coast, Barnegat Inlet to Sandy Hook.
No. 30 April, 1922.Chesapeake Bay, Smith Point to Cape Charles.
No. 31 May, 1922..Potomac River to Lower Cedar Point.
No. 32 June, 1922..York and James Rivers.
No. 33 July, 1922..Delaware Coast, Cape Henlopen to Chincoteague Inlet.
No. 34 Aug., 1922..Virginia Coast, Chincoteague to Cape Charles.
No. 35 Sept., 1922..North Carolina Coast, Cape Henry to Beaufort.
No. 36 Oct., 1922..Carolina Coast, Beaufort to Charleston.

Log Book

MoToR BoatinG has also published a log sheet to fit the standard 8½" x 11" loose leaf folder. Each sheet contains spaces for such data as time of passing various aids to navigation, names of aids, magnetic and compass courses, distances, patent log readings, speed of boat, revolutions of motor, wind direction and force, condition of weather and sea, depths of water, fuel, time of high and low water, etc., etc.

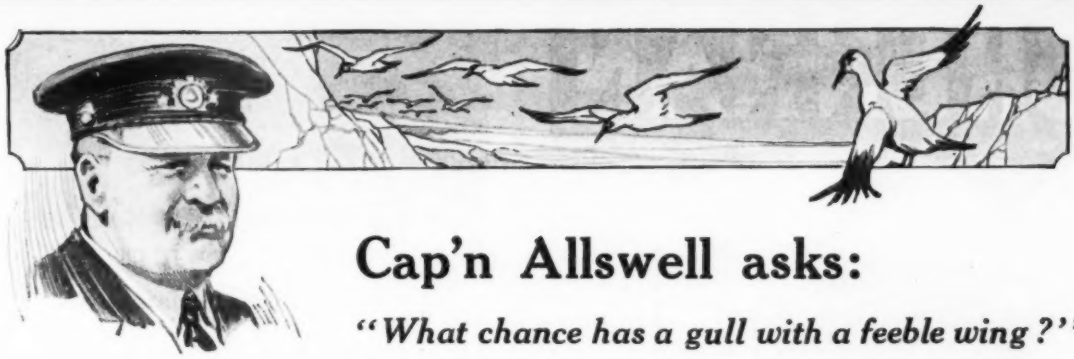
Prices

Charts 25 cents each or $1.50 per set of 12, 36 Charts for $3.50 (Series C will be sent as published). Log Sheets $1.00 per set of 50 Sheets.
Loose Leaf Binders (canvas bound) to hold charts and log sheets, $1.75.

36 Charts, 50 Log Sheets and Loose Leaf Binder to hold Charts and Log Sheets, $5.00.

MoToR BoatinG
119 West 40th Street, New York

Advertising Index will be found on page 192



Cap'n Allswell asks:

"What chance has a gull with a feeble wing?"

BY the same token, what chance has a boat with a weak propeller? Like's not she'll fail you just when you'd give your ol' eye teeth to keep up with the procession!
Give *me* a bronze wheel every time. Bronze's tough, strong and workable. You can bring the blades down thin and sharp at the tips—for speed and power—and still keep plenty of body in the shank.

If you hit a rock with a cheap, brittle wheel, the blade'll likely snap off at the hub leaving you much out of luck in the buzum of the deep! With a bronze wheel, you may get a bent tip. That's easy to fix and you're not hung up in distress. It's the truth: all's well when you've a Columbian wheel.

Why not get the facts in full?
Send for Columbian Book No. 5

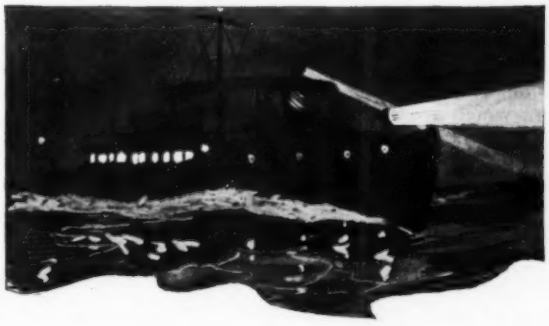
THE COLUMBIAN BRONZE CORPORATION, 522 FIFTH AVENUE, NEW YORK CITY
New York Sales Only: 44 Third Avenue.

COLUMBIAN *Bronze* PROPELLERS

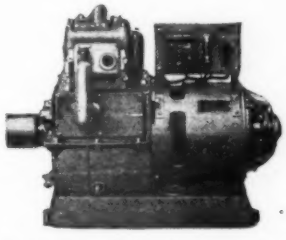
Block "L" Main Floor, Motor Boat Show.

Plenty of Light with Plenty of Room

THIS unique plant is only 33" long, 22" wide and 23" high. It leaves plenty of room in yacht or cruiser, but generates 1500 watts —all you need for the interior, the searchlight and for the wireless. The power is supplied by a 5 H.P. engine direct-connected to the generator. Not only is it a sturdy, compact plant, but the



Engine Uses Kerosene or Gasoline And Its Parts Interchange With Ford Parts



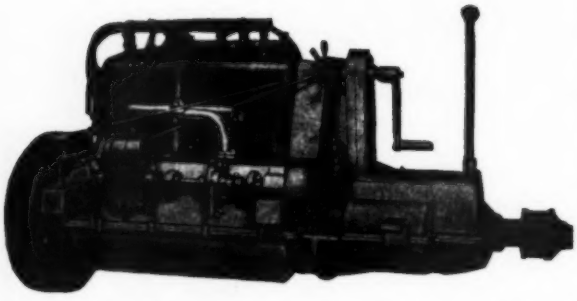
33 inches long

Send for Folder No. 5

INSTALL THE
COLUMBIAN
C-Y-C
Electric Lighting System

Columbian Bronze Corporation
522 Fifth Ave., New York City
Block "L" Main Floor, N. Y. Motor Boat Show

BRENNAN MOTORS



Put a Brennan In Your Boat

THE practical service value of your boat depends entirely upon the reliability of the engine you install. But reliability isn't entirely a matter of the price you pay. Reliability is the product of good design, plus good materials, plus experience and honesty in manufacture.

Put a Brennan motor in your boat if you want the utmost service and reliability at the lowest cost consistent with good materials and honest quality.

Brennan Motors give smooth, economical and constant service. Reliability is built into them through the perfection of each part,—through high grade materials, carefully machined and assembled,—through proper design in the first place, and proper testing as the last step before they leave the factory. It isn't necessary to pay an exorbitant price for reliability if you choose a Brennan.

Brennan Motors are manufactured in several sizes which are adapted to many different types of boats. In the Model B illustrated above, four cylinder 4½" x 5", the reverse gear, clutch and rear starter are all built in as an integral part of the design. This makes a neat compact engine that looks good and is good.

Prices Reduced By 20%

You don't have to pay peak prices if you pick a Brennan for 1922. In recently reducing our prices by 20% on all Brennan motors we not only gave our prospective customers the advantage of all present reductions in manufacturing cost and materials but we actually anticipated possible further savings which we hope to effect through increased demand and larger production. Present prices are not guaranteed against increase.

Write today for illustrated catalog and prices. Tell us about your boat if you want our recommendations as to the proper engine equipment.

Brennan Motor Manufacturing Co.

SYRACUSE, N. Y., U. S. A.
500 East Water St. *Cable Address "BINOT"*

HOMELITE

THE ideal electric light and auxiliary power plant for your boat.

Stow in corner of engine room, under sink or galley stove—ready for instant use on touch of a button.

Economical—gallon of fuel furnishing 2000 Watt Hour.

Lights boat, charges batteries, runs bilge or fire pump—heats toaster, percolator, etc. 12 or 32 Volt.

Made by

THE SIMMS MAGNETO COMPANY
EAST ORANGE, NEW JERSEY

Eastern Marine Distributors

Smith-Meeker Engineering Co.

123 Liberty Street
New York, N. Y.

Write for Booklet and Prices

Ritchie for Reliability

THE safety of your boat and often your own life depends upon the accuracy and reliability of your compass.

Ritchie Liquid Compasses have been the best on the market for over seventy years. The reputation of our product, the experience of our workmen, the facilities of our factory, the traditions of our business all insure the same high quality in every compass we produce.

Ritchie Compasses have been used exclusively in the U. S. Navy for more than 40 years. More than 60,000 of them are in service on merchant ships. Our compasses for motor boats and motor yachts are the same instruments of precision that you will find in the big ship sizes.

The best marine supply dealers sell Ritchie Compasses.

Write today for catalog and prices.

E. S. RITCHIE & SONS
ESTABLISHED 1850

110 Cypress Street Brookline, Mass.
Liquid Compasses Underlighted Compasses
Binnacles, etc.

Advertising Index will be found on page 192

The NEW MODEL "T"

FRISBIE VALVE-IN-HEAD MOTORS

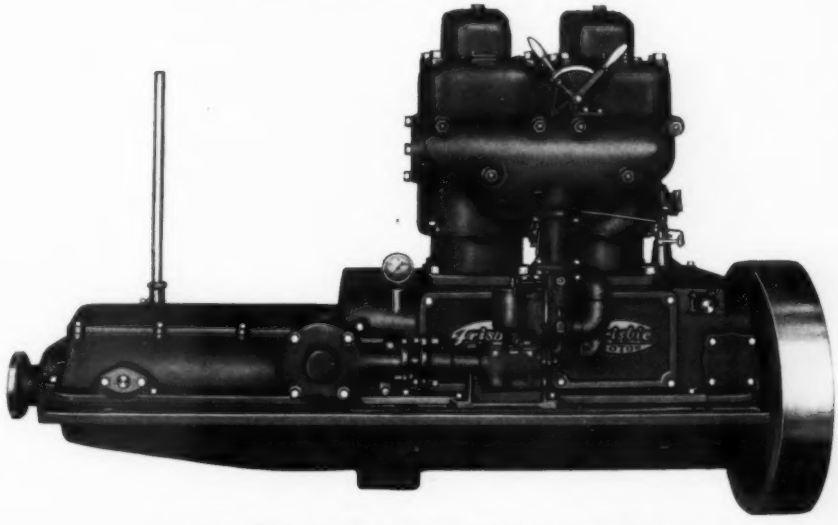
Heavy Duty, Medium Speed

T2, 2 cyl., 20 H.P., 600 R.P.M.; Weight, 1300 lbs.
T4, 4 cyl., 50 H.P., 600 R.P.M.; Weight, 2150 lbs.

High Duty, Medium Speed

T4 Special, 4 cyl., 100 H.P., 1200 R.P.M.; Weight, 2000 lbs.

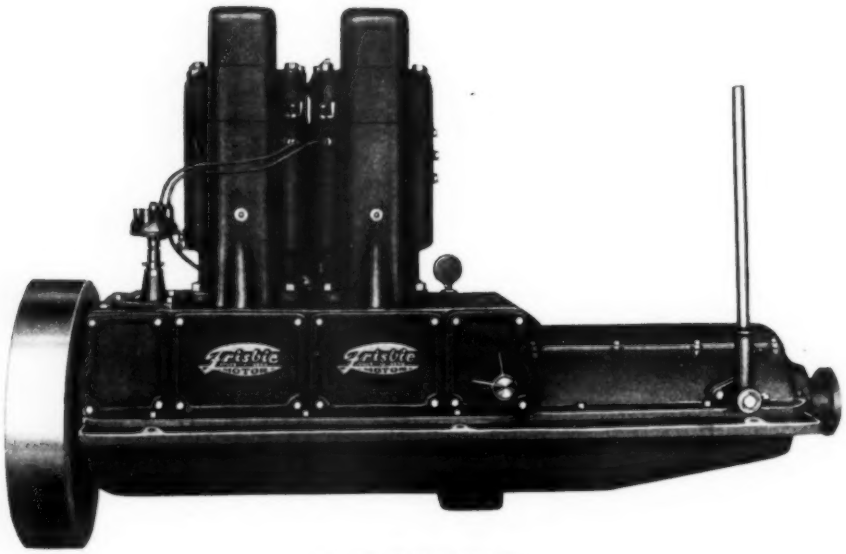
Dual Valve
All Inclosed
Hot Spot Manifold
Removable Heads



Model T2, 20 H.P., 2 Cyl., 6" Bore, 6" Stroke, 600 R.P.M.
(Manifold Side)

Frisbie an' I

Frisbie VALVE-IN-HEAD MOTOR



T2, 20 H.P. Port Side

The NEW MODEL "T"

THE T2 and T4 in this new model offer to users of heavy boats of moderate size, commercial fishermen and sailors seeking auxiliary power, an installation of refinement, cleanliness, quietness, and reliability not heretofore available for that class of work. The T4 Special provides a reliable, cleanly, all-day high duty motor for the popular Express Cruiser.

All moving parts (except the flywheel in the T2, 2 cylinder) are entirely inclosed, yet easily accessible for inspection, adjustment or replacement.

Four Valves to the Cylinder

Unusual Efficiency

Thorough scavenging. Small, noiseless, trouble-free valves actuated by one push rod and one synchronized rocker arm with self-lubricating bushings for each pair of exhaust and intake valves. This simple mechanism together with the "hot spot" manifold and other features of the Model "T" design insures unusually economical operation with the present grade commercial fuels.

Cylinders of Extra Strength

Cylinders are cast separately with uniformly heavy walls, fitted firmly into the base and held by oversize studs. The entire combustion chamber is machined, leaving no projections for carbon deposit.

Heads Are Detachable

Without Disturbing Gaskets, Intake or Exhaust Manifolds or Wiring

This unusual accessibility is obtained by carrying the gas passages within the cylinder casting to a point below the line of the head which also provides a "hot spot" intake manifold, as the incoming gases come into contact with the hot exposed portions of the exhaust line and are perfectly dried and vaporized. Jack screws are located in the head to facilitate removal without damage to the gasket. All studs are threaded and run through bosses in the castings, thus avoiding any contact with the circulating water.

Absolutely Self-Lubricating

No outside oiling whatever is necessary. Lubrication is by pressure feed through steel tubes cast in the crankcase and the oil is supplied by a gear pump installed below the level of the oil, where it is always primed and practically free from wear. There is a by-pass by which the oil

Frisbie an' I

Advertising Index will be found on page 192

Frisbie VALVE-IN-HEAD MOTOR

pressure to all main bearings can be regulated and through which oil is passed over all gears before being strained and again returned to the pump.

Crank Shaft

Crank Shafts are two and one quarter inch nickel steel with a large bearing provided for every throw. The reverse gear is set between flanged couplings and is readily removable, although completely inclosed.

The bearings are all replaceable and adjustable and are hung in the upper half of the crank case in accordance with modern practice. This includes camshaft bearings, which are on plates set into the side of the base, allowing the removal of the entire camshaft without disturbing any other part of the motor.

Water Circulating Pump

On the 2 cylinder medium duty motor the water pump is of the bronze plunger type, driven at camshaft speed, while on the T4 and T4 Special it is of the gear type for quiet and efficient operation at higher speeds.

Carburetion

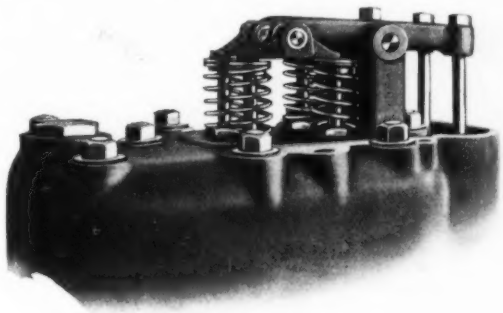
Warm air for the carburetor is taken both direct through an exhaust stove and through rocker arm and push rod inclosures to and through the base, thus ventilating the valve operating mechanism and carrying any smoke out through the exhaust.

Efficiency

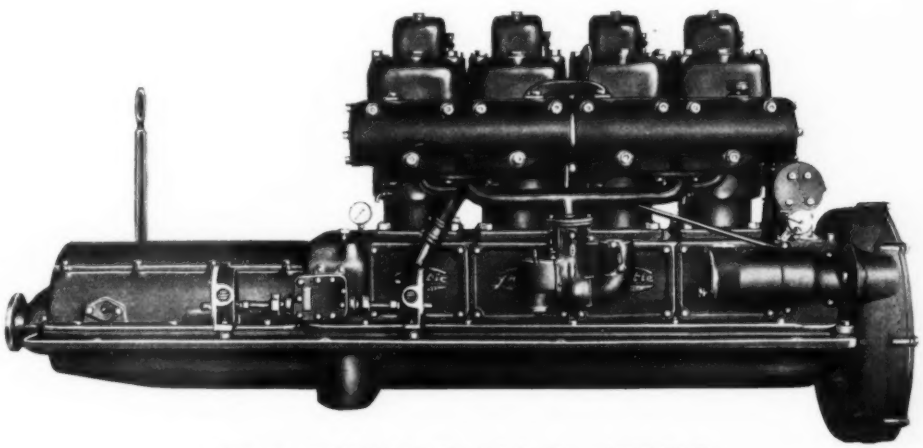
Dynamometer tests in which this motor developed nearly 20% above our conservative power rating, supplemented by exhaustive tests in boats, show an average fuel consumption of .58 pounds horse power per hour; and Model "T" engines in continuous operation under service conditions have proved as far superior as were the other models of the "Friendly" Frisbie Family when designed and placed on the market some twenty years ago.

Equipment

Equipment consists of engine, reverse gear, spark plugs, water circulating pump, priming cups, car-



Showing cylinder head of Model "T"



Showing manifold side T4, 4 Cyl., 50 and 100 H. P.

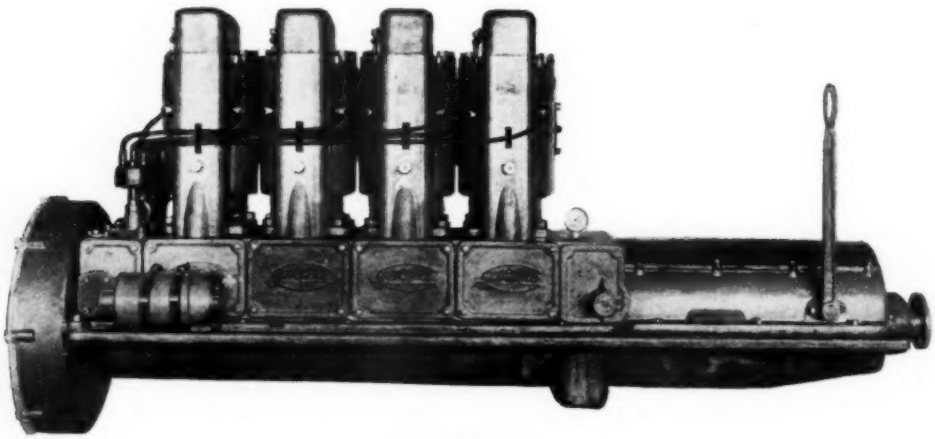
Frisbie an' I

When writing to advertisers please mention MOTOR BOATING, *the National Magazine of Motor Boating, 119 West 40th Street, New York*

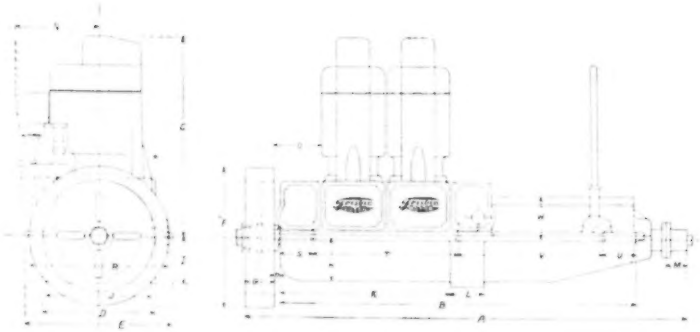
buretor, oil gauge, switch, ball thrust bearings, mounted control levers and standard ignition. Electric starting and lighting and double ignition equipment is furnished as an extra on Model T2, which this motor is designed to accommodate as a complete power unit. This equipment is standard on models T4 and T4 Special. All accessories used are standard and parts can be obtained at any service station of the manufacturer involved.

Guarantee

Every engine is absolutely guaranteed against defects in material or workmanship for a period of one year from date of shipment, and any parts found defective will be repaired or replaced free of charge if returned to the factory for inspection, transportation charges prepaid. This guarantee does not apply to cases of carelessness or abuse, or to work done outside our factory.



Port Side of T4



KEY TO DIMENSION CHART

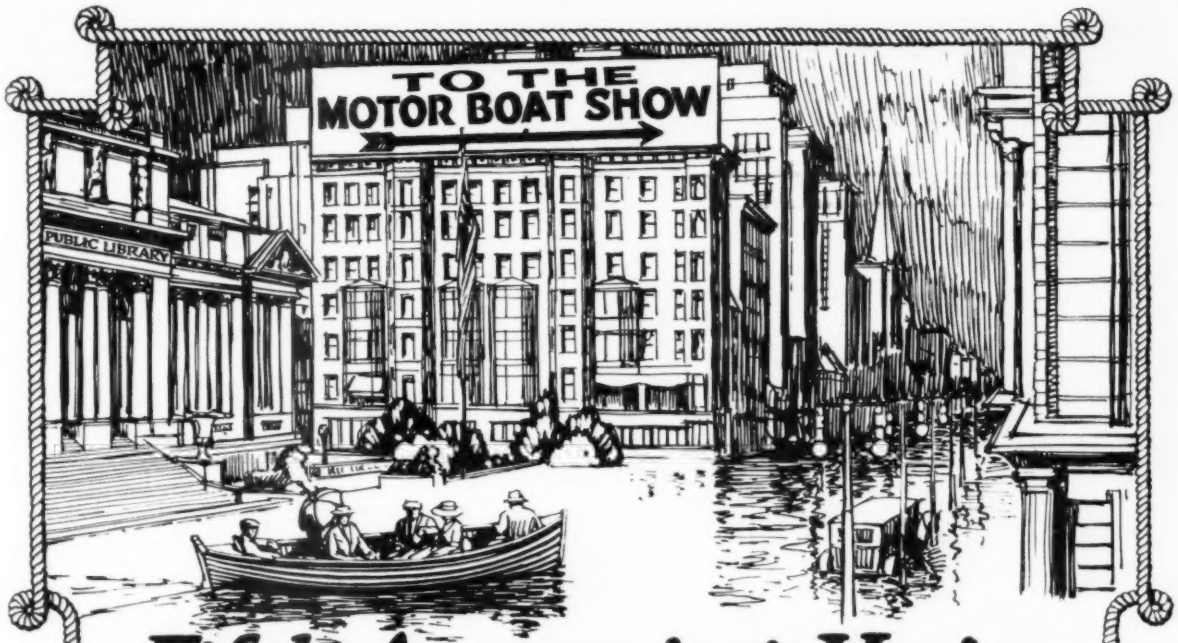
	A	B	C	D	E	F	G	H	I	J	K
2-Cyl.	62¼"	50⅝"	28⅞"	16"	21"	20"	4"	6"	6¾"	15"	24¼"
4-Cyl.	85½"	72⅞"	28⅞"	19"	24"	20"	4"	6¼"	6¾"	15"	43¾"

	L	M	N	O	P	R	S	T	U	V	W
2-Cyl.	4¾"	3"	12"	6¾"	¾"	19½"	4 13/16"	19⅞"	2 5/16"	23⅝"	6"
							Lag Bolt Centers				
4-Cyl.	4¾"	3"	12"	6¾"	¾"	22½"	4 13/16"	20½"	6 9/16"	20½"	7⅝"

The Frisbie Motor Co., 7 College St., Middletown, Conn.

Frisbie an' I

Advertising Index will be found on page 192



Fifth Avenue isn't Venice
—BUT A WATERFORD—

will carry you and your family on *your* "Fifth Ave."—on river, lake, or ocean with economy and with absolute safety. A Waterford is always ready to deliver dependable water transportation as you want it.

Your summer home or camp is incomplete without a Waterford. It is a luxurious necessity. Treat your guests to a water ride in a Waterford.

Fishermen and hunters are buying the Waterford because of its Maxim-silenced motor and because it gets them into the shallow places—bays and headwaters—without oar work.

A Waterford goes over sunken logs, rocks, submerged objects automatically without injury to its propeller. Travels anywhere from a trolling speed to 12 miles per hour.

Waterfords are built in three models—Scout, Utility and DeLuxe. They are delivered complete, ready to put in the water and run. Standardization in manufacture coupled with volume production puts the prices at $375, $425 and $475.

Write for illustrated catalog. It answers every question, shows the Waterfords in natural color, is full of information, and tells you how you can enjoy the real pleasures of water transportation economically.

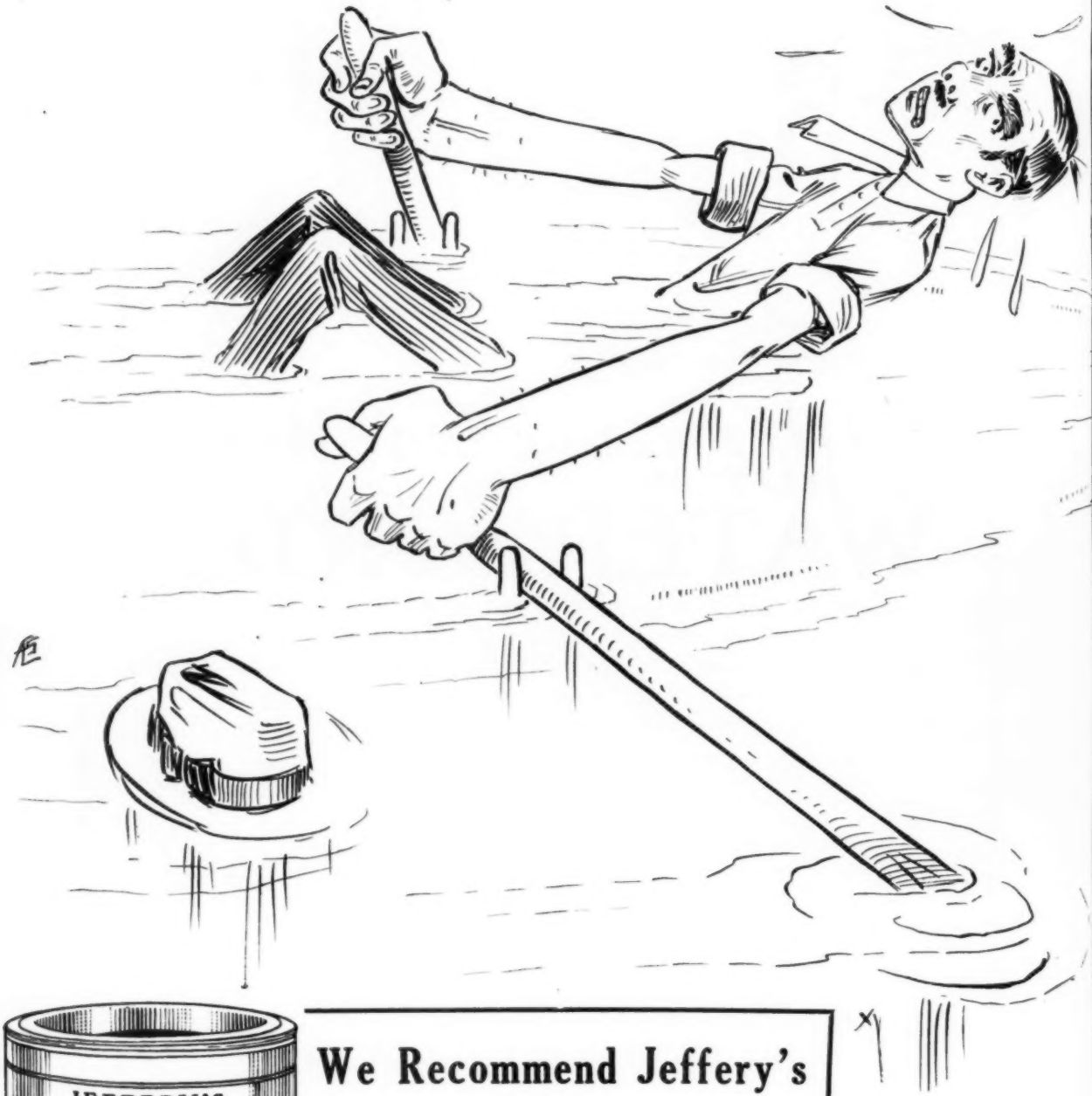
Over 4000 in use on the waterways of U. S. & Canada

DISAPPEARING PROPELLER BOAT CORPORATION - 725 Main St., Buffalo, N. Y.

Factories at North Tonawanda, N. Y., Wisconsin Rapids, Wis., Seattle, Wash., and Port Carling, Ont.

Sporting Goods Dealers Should Wire for Agency Proposition.

DOES YOUR

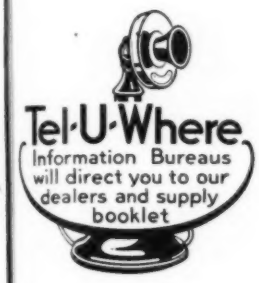


We Recommend Jeffery's

No. 1 Extra Quality Marine Yacht Glue for paying deck and hull seams; No. 7 Soft Quality Marine Glue for waterproofing cotton and canvas for covering decks and cabin tops, also for covering hulls of row-boats, motorboats and yachts.

Advertising Index will be found on page 192

BOAT LEAK?



Send for our Booklets

"How To Make Your Boat Leakproof" and "Marine Glue—What To Use and How To Use It."

Any old boat, so long as the frames are in fair condition, can be made water-tight by following the instructions in the above booklets. This applies to anything that floats, from a canoe to a yacht. Wood or steel. Put your leak troubles up to us, and we will help you to stop them.

Insist on having Jeffery's Marine Glue. For more than 75 years it has been the choice of the foremost boat builders of the world.

Jeffery's is a product that has not varied from the strict line of quality—it is not a competitive commodity made to meet a price.

JEFFERY'S WATERPROOF MARINE GLUE

We carry a large stock of all various grades. Each grade is for a different purpose. It is important that you use the grade *we recommend*.

For sale by all Yacht, Boat and Canoe Supply Houses, Hardware, Paint and Oil and Sporting Goods Dealers.

L. W. Ferdinand & Company

152 Kneeland St.

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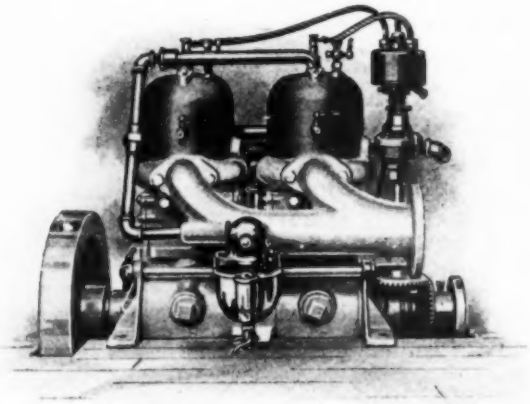
Fit For The Finest Boat Afloat!



Model B—10-16 H.P.

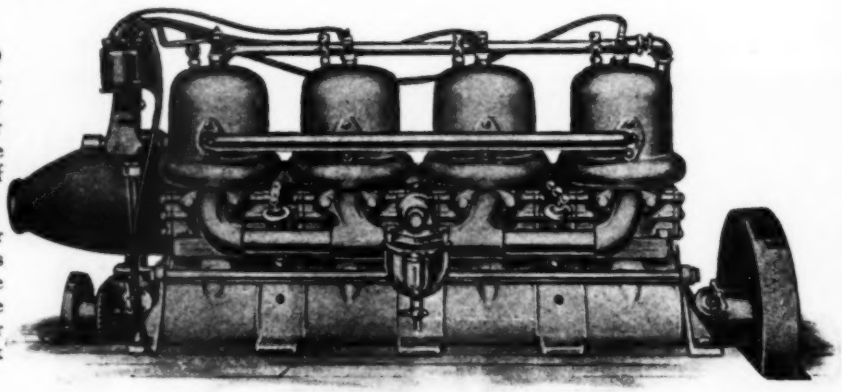
"HARVEY" motors are strictly high grade Marine Motors. Combine the reliability of Four-cycle motors and the simplicity and economy of the Two-cycle motors and your answer is HARVEY MOTORS.

For the small open Launch, Runabouts, Speed Boats, Workboats or Cabin Cruisers.

Light in weight, with STRENGTH where STRENGTH is necessary.

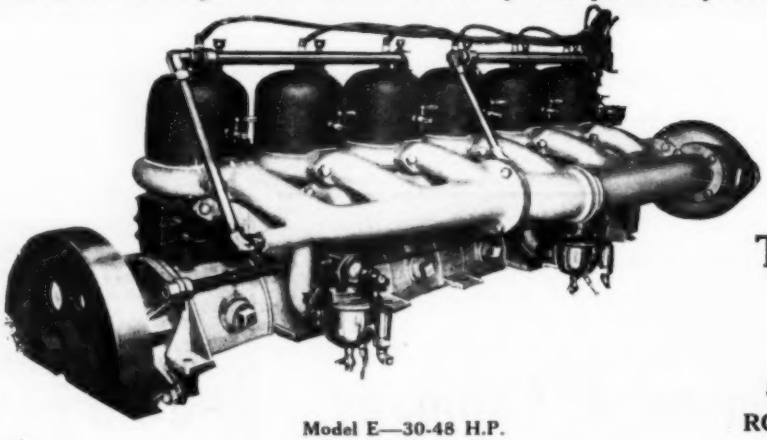
There are NO VALVES in these motors. It is not necessary to have them as our design gives you more power, and the cost of operation is smaller.

Why buy a motor that has valves if it is not necessary to have them, and at the same time gain more power without them? Think it over.



Model D—20-32 H.P.

Only a few more weeks until Spring. Place your order NOW and be ready to enjoy a REAL boating season with a REAL power plant in your boat.



Model E—30-48 H.P.

Made in five models
One to Six Cylinders
5 to 48 H.P.

Write for catalog.

THE HARVEY MARINE MOTOR CO.

82 HARVARD STREET
ROCHESTER, N. Y., U. S. A.

Note—Special Prices for the Motor Boat Show.

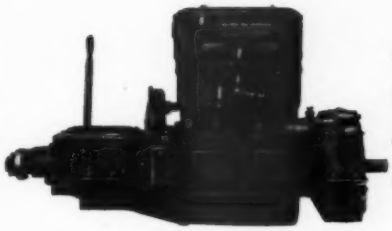
In order to further introduce our motors, we are offering a big reduction on all motors sold during the period of February 15th-28th (inclusive).

Formerly Known as the Celebrated Leary Motors.

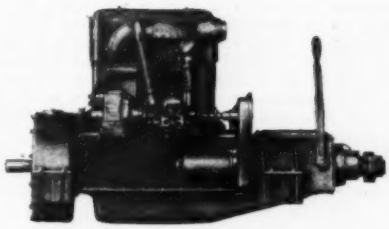
Advertising Index will be found on page 192

Knox
VALVE IN HEAD

"STEADY SERVICE"



From Every Side— a Masterpiece of Marine Motor Engineering



1921 Was A Good Season For the KNOX "20"

DURING the past boating season KNOX "20" has had plenty of opportunity to show its ability. In fast runabouts, in cruisers, in every type of boat up to a 64-foot auxiliary, these motors have been installed with great satisfaction to their owners, and with frequent surprise to observers who did not realize what twenty real dynamometer horsepower means.

We made the first public showing of the Knox "20" at the last Motor Boat Show. It was a brand new motor, just put into production. Unusual quality in design and construction was evident to experienced motor owners. But it still awaited the test of general service.

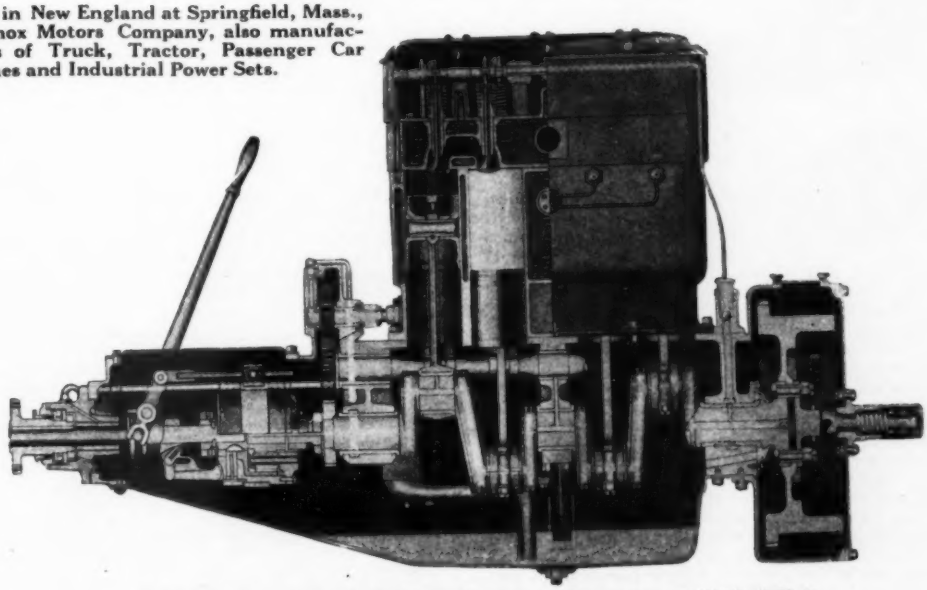
Now the KNOX "20" is a tried and proven product, not merely in factory tests under ideal engineering conditions but in daily use in the hands of actual boat owners. It has demonstrated in other boats just what it would do in your boat. It has demonstrated that quality counts, and that advanced engineering has produced a better marine motor than could have been designed with the degree of engineering knowledge of only a few years back.

Buy an up-to-date motor,—the KNOX "20". Write for catalog.

KNOX MOTORS ASSOCIATES

SPRINGFIELD, MASS., U. S. A.

Made in New England at Springfield, Mass., by Knox Motors Company, also manufacturers of Truck, Tractor, Passenger Car Engines and Industrial Power Sets.



You can trace the remarkable internal pressure oiling system of KNOX "20" in this drawing. But come to the Boat Show and let us show you on the engine itself.

Motor Boating

The Journey's End

(*Continued from page* 16)

the heavy weight of gasoline drums, and the sharp edges of acetylene bottles have pressed against it—and he successfully defied me to find a dent in its surface. If Hippocampus had been provided with a rub-streak of teak before passing through the Gatun locks she would not now require the services of a carpenter on her port side.

That evening we motored with a party of friends back to Colon for a go at the movies, and that night for the first time since our departure from Key West we fought a battle with the mosquitoes. In the terminal cities, and elsewhere in the Zone at a distance of more than 200 yards from the lake shore line, mosquitoes are practically non-existent, but at the light-house dock they are wild and wicked and voracious. Our old friend Citronella ministered to us through the night, but I suspect the Gatun mosquitoes of drinking from the mouth of the bottle and returning refreshed to the onslaught.

Consequently we were cheerless and heavy-eyed when our friends Arnold and Stevenson descended from the morning train from Colon and boarded us for the run across the canal. It was raining dismally at the time (as Davidson, who had slept on deck under the awning could well attest) and as we looked out over the broad reach of the lake we could see nothing. But the tropical clouds were incapable of spreading a wet blanket over the spirits of our new guests. They know the rainy season, and they confidently predicted that with the starting of the motor the rain would slack off and stay slacked off for the rest of the day.

As a matter of fact it did, and although the day was overcast, we were informed that we could have no more perfect weather for the Isthmian jaunt. The clouds, spreading a canopy under the sun, kept from us the infernal heat that is still remembered with dread by the men who dug Culebra Cut.

In itself our trip across the Isthmus was uninteresting, for the canal is so perfectly buoyed that a blind coal passer could not lose his way. But the proximity of the jungle and the anachronism of ocean-going ships meeting and passing in fresh water served as fuel for conversation. At Darien, where there is a powerful Naval radio station, we looked eagerly for the peak upon which our old friend Balboa stood when he sighted the Pacific—a peak immortalized in the lines of Keats:

"Or like stout Cortez when with eagle eyes
He stared at the Pacific—and all his men
Looked at each other with a wild surmise—
Silent, upon a peak in Darien?"

It's all the poetry I know, and Bartlett had to help me with the first three lines, but I had the satisfaction of declaiming it when under Steve's expert ciceronage, we found the peak—a green, close-cropped by the canal engineers, and seemingly no higher than a dozen hillocks surrounding it. Subsequently we learned that the peak where Balboa (or, if you take the poet's word for it, Cortez) stood and stared is situated in another Darien several counties nearer the Equator. But we had the thrill.

We had a very good time altogether. Someone cooked up a Navy mulligan at the psychological moment and we partook of its deliciousness as we passed between the still slipping sides of Culebra Cut—now known on the charts, but nowhere else, as Gaillard Cut. As we came to the locks of Pedro Miguel (invariably called Peter Mike) we licked from our fingers the last vestiges of the chocolate cake which Mrs. Arnold had contributed to cap our meal.

So fortified we were ready for anything—but found instead that peace and hospitality were to attend the last few miles of our southward voyage. At the Peter Mike locks we were informed that a welcome and safe mooring awaited us at the anchorage of the Balboa Boat House, and farther on at Miraflores a military-looking individual in the uniform of the lock guards cupped his hands and bellowed,

"Have you got your orders?"

"What orders, sir?" we asked, habit slipping a mental cog back to sub-chaser days.

"Your orders to make yourselves at home at the Balboa Boat House."

Having been subconsciously prepared for the command. "When gassed and provisioned you may put to sea," our relief was intense, and gratitude rendered us inarticulate.

A few minutes later we dropped quietly to sea level, and when the last gates opened found ourselves at last in the waters of the Pacific. There was room at this juncture for reminiscence of the hundreds and thousands of crooked miles that we had put behind us in linking Balboa with New York—but there was no time for reflection. As we swept out with the falling tide a small boat intercepted us and we were boarded by a man who we thought and feared was a pilot. If he was a pilot—and the insignia on his cap seemed to proclaim him such—he was spoiling our record in the last two miles of the journey. If he was not a pilot, he was as welcome as flowers in May.

Our anxiety was not relieved until after we had anchored at his direction and he had left us to our own devices. Then Red Gibson, the Balboa jack-of-all-trades, Whaler, Lear, Potter, and other yacht club members boarded us and we were informed that, anchored where we were, we would go high and dry at low water. So we knew that we had come to the southern point of our voyage without accepting the services of a pilot. Our escutcheon was still clean.

Getting under way again we secured our anchor on deck, and made fast to a club mooring, thereby paving the way for our last misadventure. For the next thirty or forty minutes there was a mad flourish of clothes below decks, from which emerged the crew of Hippocampus, slightly immaculate in liberty whites and with appetites whetted for a meal at the Century Club in Panama City. Lear had extended the invitation to crew and supernumeraries, but of the latter Stevenson and Arnold had other engagements, and only Davidson accepted. Carr, another club member, came alongside in a floating tin Lizzie which is the admiration and wonder of all inhabitants of the Gold Coast, and we were ferried ashore.

Of the dinner at the Century Club, graciously presided over by Lear's pal, his 14-year-old daughter Dora, of the ensuing drive through the cool of the evening along the smooth Pacific highways of the Zone, of our next day's visit to the ruins of Old Panama City, as guests of Davidson; and of other hospitality and diversions, there is room for no more than the merest mention. The arrival of Hippocampus at Balboa had been expected since June, and in August we were made to understand that our welcome had been elastically extended.

With the focus of our interest directed ashore poor little Hippocampus suffered a severe dislocation. Neglect put her nose out of joint, and when on the day after our arrival, the evening tide swept seaward in its sixteen-foot fall, she determined to create a diversion on her own account. Deftly, quietly, but with a grieving heart she dragged her club mooring to a high spot on the middle ground which parallels the water front, and there immolated herself on a sandy altar. At midnight when we left the shore in the club tender, caroling softly as voyageurs are wont to do in the sma' hours, Al Chambers' keen eyes were suddenly attracted by the silhouette of tilted spars against the skyline.

"Hello," he said, "Some poor dub is high and dry."

A tightening of the throat strangled my feeble effort to sing the bass of "Merrily We Roll Along," and I whispered,

"A thousand dollars (which I haven't) to one (which I hope to have) that I'm the dub."

Sure enough I was. As we drew nearer, we saw Hippo lying over on her side, in the pathetic attitude of one who, having struggled to do her best, has wearied of well doing. Around her there was enough water to float the club tender, and from it I stepped to the diagonal plane of Hippocampus' deck.

Below there was much confusion. Clothes, camera, typewriter, and cushions lay in a conglomerate heap on the cabin deck, a heap surmounted by my precious sextant. On nine hundred and ninety-nine other occasions I had wedged the sextant in its rack secure against Hippo's most erratic gyrations. On the thousandth I had neglected it. Even the chronometer, my most cherished instrument, hung precariously, fixed by two threads of one screw, for I had been in the act of dismounting it for packing when interrupted by some other duty.

But the good luck which has attended us in all our mishaps saved our possessions from major injury, and I derived much consolation from the fact that we were heeled over to port where my spare clothes were not. Chambers, whose neglected turn it had been to pump the bilge, also came out unscathed, but Squibb's locker received the bilge water.

Seeing that we could neither sleep nor mend matters until the tide had again risen, we returned with blankets to the yacht club and turned in on the porch deck. At three o'clock I was again aboard to watch Hippo come to an even keel, and to learn that she had done herself no harm in her adventure. The others joined me and we slept until mid morning, when we cast off our mooring and anchored in deep water.

So the cruise of the Hippocampus ended as it had begun and as it had been continued for four months, a chapter of hair-breadth escapes from amusing or frightening misfortune. On a dozen occasions if we had been a little more favored by Fate there would have been no story to write, and contra, if we had been less favored there would have been no one left to write the story. Success has crowned our efforts.

* * *

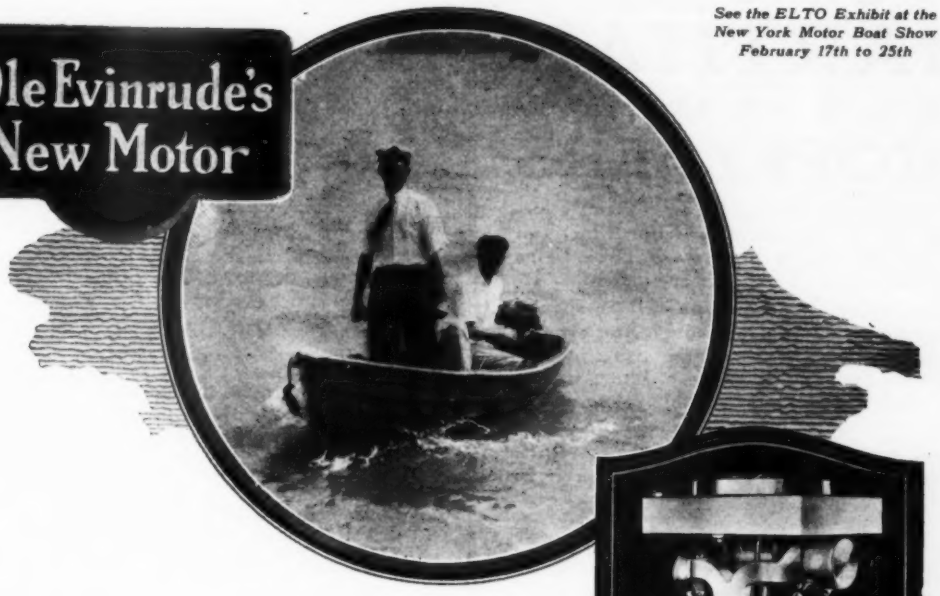
I have told in a previous issue of our reluctant decision to halt halfway to Frisco, of our overdraft on the bank of time which necessitated my return to New York. In the delightful closing hours of the cruise we wished more and more fervently that we might go on without cessation—but we steeled our determination, and after only three days in Balboa headed north again, bound for Gatun Lake and the business of putting Hippocampus out of commission for the winter months.

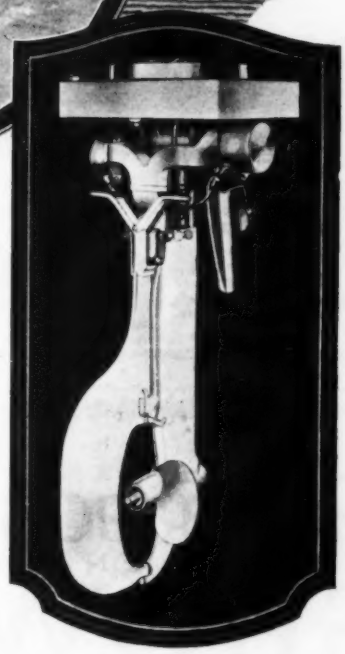
A week passed in unshipping spars and sails, in drying cushions

(*Continued on page* 184)

See the ELTO Exhibit at the New York Motor Boat Show February 17th to 25th

Ole Evinrude's New Motor





Lightest Weight per Horsepower — Compact!

THE Elto, Ole Evinrude's new motor, is light yet rugged; powerful and speedy; compact and space-saving; the outboard motor which ideally fulfills the requirements of yachtsmen and owners of large power boats.

A twin-cylinder, 3 H.P. motor—more power for your tender. Only 48 lbs.—an easily manageable weight to lift from one boat to the other. Folding rudder, compact construction throughout. For stowing away, less space is required than by any other outboard motor.

Atwater-Kent ignition, quick, easy starting. No noticeable vibration. Motor tilts automatically when striking obstacles in the water; can be tilted clear of the water for beaching.

The Elto has 19 big, surprising improvements. All have proved practical. Write, today, to Ole Evinrude's new organization for the Elto catalog.

ELTO OUTBOARD MOTOR CO.

Ole Evinrude, Pres.

Dept. F Mfrs. Home Bldg. Milwaukee, Wis.

ELTO
Carrying Case

The neat, compact Elto Carrying Case adds greatly to the convenient transportation of the Elto on train, street car or automobile. On hunting and fishing trips this Carrying Case serves to great advantage. It is strong and substantial, yet light. Laminated bass wood covered with durable, waterproof imitation leather. Nickel plated hinges and lock. High-grade appearance.

Elto

Light Twin Outboard Motor

GENUINE
HARTHAN
TRUE SCREW
PROPELLERS

The principle of a True Screw is strictly followed out in the patterns from which all genuine Harthan Propellers are made. This type is known to be the most efficient.

Harthan wheels are made of a special bronze composition, very tough and strong. This allows a very thin blade, the edges of which are brought down very sharp, which, with the extra high polish, reduces the power-absorbing element to a minimum.

We can supply propellers with two or three blades, in practically any pitch, either right or left hand.

Look for the Trade-Mark on Each Blade
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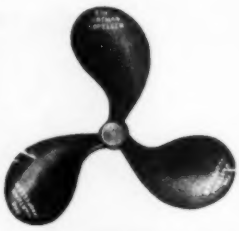
PHILADELPHIA: F. Vandercherchen's Sons, 7 N. Water Street.



17th ANNUAL NATIONAL
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AUSPICES NATIONAL ASS'N ENGINE AND BOAT MFRS., INC.

ALL THAT IS NEWEST AND SMARTEST IN MOTOR BOATS AND THEIR ACCESSORIES — CRUISERS, SPEED CRAFT, SEDANS, LIMOUSINES, SLOOPS, RUNABOUTS, DORIES—THINGS IN WHICH THE BOATING ENTHUSIAST JUST REVELS

GRAND CENTRAL PALACE
NEW YORK
FEBRUARY 17th ~ 25th, 1922
10 A.M. TO 10.30 P.M. ~ ADM. 75¢ (INCL. TAX)

Racing at Miami

(*Continued from page* 17)

A. T. Griffith, Peoria Ill., J. S. Stearn, Ludington, Mich., Robert Ringling, Chicago, Ill., and Sarasota, Fla., Geo. Leary, Jr., New York City. W. W. Robinson, Camden, N. J., E. G. Sewell, Miami, Fla., Thos. J. Pancoast, Miami Beach, Fla., Tom. Webb, Peoria, Ill., W. B. Wilde, Peoria, Ill., T. F. Newman, Cleveland, O., A. W. Goodrich, Chicago, Ill., Fred E. Wadsworth, Palm Beach, Fla., and J. P. Stoltz, New York City.

Charles W. Kotcher will act in his accustomed position of starter and Commodore Eugene Quigley of Cleveland will act as chairman of the Timers and Scorers. Associated with Commodore Quigley on his committee are the following: E. W. Gregory, Detroit, Mich., Stanley Morgan, Detroit, Mich., Odis A. Porter, Indianapolis, Ind., M. S. Cornell, Jr., Middletown, Conn., G. T. White, New York City, A. J. Utz, Buffalo, N. Y., W. R. Gibb, Middletown, Conn., H. L Stone, New York City, Wilbur Young, New York City, F. W. Roberts, Cleveland O., Ernest Venn, Detoit, Mich, and Horace E. Dodge, Detroit, Mich.

H. R. Duckwall, of Indianapilis, Ind., H. F. Williams, of Akron, O., and Edward Crozier, of Palm Beach, Fla., will be the committee in charge of the patrol.

As usual A. C. Newby, of Indianapolis, Ind., with John Levi and W. E. Brown, of Miami Beach, Fla., will be in charge of the course.

The Hon. T. E. James, Mayor of Miami Beach, has promised to act as chairman of the Reception Committee, with G. W. Livingston, of Miami and C. S. Krom, of Miami Beach.

The Publicity and Entertainment Committee will be as follows: A. A. Schantz, Detroit, Mich., C. W. Chase, Jr., Miami Beach, Fla., C. W. Kotcher, Miami, Fla., W. D. Edenburn, Detroit, Mich, J. Lee Barrett, Detroit, Mich., R. B. Burnham, New York City, Gordon Nye, Miami, Fla., and Geo. Slocum, Mt. Clemens, Mich.

The headquarters will be at the Hotel Flamingo, Miami Beach.

In past years the southern racing has been restricted almost exclusively to runabouts. It was at Miami Beach last winter, where new world's records for runabouts for all distances were established in the 150-mile race for runabouts. It was there that the Sea Sled, Orlo II, owned by George Leary, Jr., of New York City, set a record of 40 miles an hour on a 2 1-2 mile cruise and a record of 38.8 miles per hour for 50 miles around the same course. Orlo II then went into the mile trials and established another record of 47 miles per hour.

Express cruiser racing has also been a feature of the southern races.

This winter at Miami the usual races for runabouts and express cruisers will be repeated with several new events for these boats also. In addition there will be numerous other events for other types of craft. A chance race in which all types of craft may enter will be held for the first time this winter. It is expected that this event will be very popular with the hundreds of craft which will be at Miami for the winter. There also will be a free-for-all race for runabouts, a number of handicap events for slow cruisers.

A new race this year will be an express cruiser event from Miami to Havana, Cuba, for trophies put up by a number of prominent citizens of Cuba. This race will have an international aspect to it as it seems probable that several fast boats will come over from Cuba to test their speed against the American craft. Coming back from Cuba the boats will race from Havana to Key West and from Key West to Miami.

The usual competition for the Fisher-Allison $5,000 trophy will be held on March 2, 3 and 4, and on March 7, 8 and 9 the three heats for the Wood-Fisher Trophy will be held. This is the first time that competition for this trophy has ever been held at Miami.

Gladys, a Snappy 20-Foot Runabout

(*Continued from page* 35)

General: Necessary equipment such as running-lights, anchor, and lines, fog-horn, pyrene, cushions, linoleum, etc., are not included. If boat is to be built by a builder, this can be either be included or furnished by owner. Oil, or electric lights may be used. If electric, suggest the Hacker type, combination post light (including bow lights, bitt, and flag socket.) Also, combination aft flag pole and light. Suggest 15-pound stockless or folding anchor with half-inch Manilla line. One half inch cotton line for painter lines. One pyrene, one fog-horn, one electric motor diriven horn, mounted under clam ventilator. Or regulation mouth type whistle. Cushions to be of Muleskin material and kapoc filled. Paddle and pike pole. Regulation battleship type linoleum of 3-16-inch thickness.

Advertising Index will be found on page 192

DIESEL ENGINES for PLEASURE YACHTS

IDEALIA, 84′ x 14′ x 3′, is powered with a 120 H.P. NELSECO Diesel engine which drives her 14¼ miles per hour, using only six gallons of fuel oil per hour. It would take 15 gallons of gasoline to produce the same power, *at approximately ten times the cost.*

Everyone concedes the advantages of Diesel engines for commercial boats. The case of Idealia and other successful installations prove that NELSECO engines are equally suitable for substantial pleasure yachts and large cruisers.

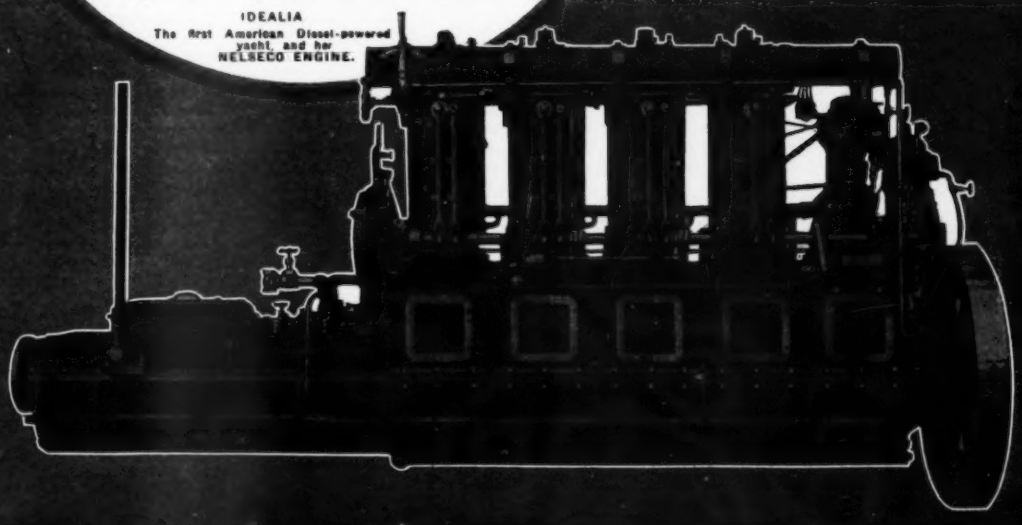
The broad experience of this company, the first to build a Diesel Engine in America for marine use, is at the disposal of those who are interested in investigating or planning a Diesel powered boat. Our engineers will take pleasure in working out your power problem if you will put it up to them. 120 B.H.P. to 3400 I.H.P.—over 150,000 B.H.P. in use or on order.

Let us send you complete information. Give us the details of your boat.

THE NEW LONDON SHIP & ENGINE COMPANY
Groton, Conn., U. S. A.

Pacific Coast Office: 402 Exposition Bldg., San Francisco, Calif.

IDEALIA
The first American Diesel-powered yacht, and her NELSECO ENGINE.



Practical Hints on Small Boat Handling

(*Continued from page* 30)

comfort. Pass slowly over the spot selected, with your anchor stocked and ready and your cable coiled on deck, clear and ready to run. If everything looks favorable, reverse your motor and back up over the spot, letting go the hook when desired. Keep the motor in stern gear long enough to straighten out the scope and make the anchor bite. Then stop your motor and snug up for a night in port.

All cruising craft need three anchors. A light one for use in fine weather when anchoring for lunch or to catch a few fish. A service anchor for general use when anchoring over night and which should be considerably heavier. And a heavy emergency anchor stored perhaps beneath the cockpit floor with cable to match and to be used in bad weather, when forced to anchor outside or on a lee shore. Maybe this latter anchor will never be wet, but the feeling of security it gives will be worth its cost and more.

The weights of anchors and sizes of rode lines and chains have been frequently tabulated. For a thirty-five foot raised deck cruiser, I should carry a twenty-five pound light anchor, a forty pound service anchor and a seventy-five pound heavy anchor in reserve. Cables of thirty to fifty fathoms in length and from 5/16 to 1 inch diameter should be provided for the different hooks. Chain is unnecessary on small craft and a windlass may be dispensed with on any cruiser up to thirty-five feet.

The Dinghy

The dinghy presents a problem not easy of solution. On any craft of the size we are now discussing, she is a necessity and must be towed astern, since any cruiser under forty feet has no business to carry a dink on davits or even lashed upside down on deck. I have personally found that a twelve foot dory skiff makes a fine little tender. She was seaworthy, easy to row, towed well, and was not bad to look at. I towed her on the after slope of the second stern wave and she behaved well even in rough water with no longer towline than this. Another thing, these boats do not exhaust the bank account.

I would right here say a word regarding landing on a beach through surf. The surf from seaward does not look as heavy as it really is, so be careful. Keep your boat always at right angles with the line of breakers. Use all speed possible when running in on an advancing breaker and jump overboard the instant she touches the sand and rush the boat up the beach.

It may sometime be necessary to run up alongside of a moving steamer in a small boat and throw or take a line. The big boat will be moving faster than you can realize. Head the way the vessel is going and when she is alongside, take her line from forward but do not get too much weight in your bow or she may drag under, use plenty of line and do not snub her too abruptly. Do not tow too far aft as you might get mixed up in her wheel if she is light.

Outfitting

In outfitting a small cruiser, too much stress cannot be laid on securing strong, durable articles of deck hardware and equipment. The steering gear in particular must be as nearly trouble-proof as can be devised. The ground tackle, fire extinguishing equipment, bilge pumps, running lights, tool outfit, fuel storage, electrical outfit, all deserve the most painstaking care in selection and maintenance. Charts of all waters in your vicinity should be carried in a water tight case always ready at hand.

When cruising, take along a camera and keep a log which you can illustrate with snapshots taken at opportune moments during the out. Record all happenings in the log. When you left the Yacht Club, when you passed this headland or that lightship. When the weather changed and who was in the bunch that came aboard to supper that evening. Souvenirs like these are beyond price and keep alive the charm of motor boating during these long winter evenings when the good old summer time seems a long way off.

Some Tidal Data

We have learned how important it is when nearing the land in foggy weather or when in doubt, to take casts of the lead and by plotting these soundings on a piece of tracing paper on the scale of the chart, and laying this plot on the chart until the figures agree, to obtain the true position of the vessel.

The figures given on the chart are however for chart datum, that is, on the Atlantic Coast of North America, except British America, for mean low water; on the Pacific Coast of North America, it is lower low water than is shown, for Central America and Mexico mean low water springs, and for the rest of the world approximately the same is used. So the charts show the depth at their various positions when the tide is at that level, but it very seldom is. At high water it may be as much as forty feet or more deeper, with varying amounts between. Thus to make a correct comparison it is important that the soundings observed with the lead should be reduced to the level of the soundings given on the chart. This reduction is also useful for ascertaining the depth of water on the bar of a river or harbor.

It might be thought that this would be just a simple sum in proportion, that if the tide fell 12 feet in 6 hours that two hours after high water it would have fallen 4 feet, but in fact it would have fallen about 3 feet, as the tide rises and falls in what is known as a harmonic curve. The process being slow towards slack tide and rapid at half tide.

Provided the rise and fall is regular, it is not difficult to construct a diagram which will give the height of the tide above Chart Datum, which is equivalent to the amount to subtract from the soundings as shown on the lead line, to make them agree with the chart at any time and place.

Where the tides are very erratic, neither this nor any other method is reliable. In some places there are four tides a day and at others only one, and so forth. Luckily these places are rare and we have in the Tide Tables reliable data for most of the coasts of the world.

On the Lakes, some parts of the Pacific coast (at the nodal line) and elsewhere that the tide does not rise and fall more than a few feet reduction of the sounding obtained is, of course, unnecessary.

The best and most accurate method is by means of tidal diagrams, which may easily be constructed on a piece of ruled paper. The method of making and using them is fully described under Figs. 269-271.

The following table is simple but not quite so accurate. It is calculated for a six hour tide.

To Ascertain the Height of the Tide Above Low Water at Any Hour of the Ebb or Flood

By multiplying any given rise of the tide, spring or neap, by the constant given in the table, the height of the tide at that time can be found at any hour.

Falling Tide After H. W. H. M.	Rising Tide After L. W. H. M.	Constant for 6 hours Ebb and Flood
0.0	6.0	1.0
0.3	5.3	0.96
1.0	5.0	0.92
1.3	4.3	0.84
2.0	4.0	0.75
2.3	3.3	0.63
3.0	3.0	0.50
3.3	2.3	0.38
4.0	2.0	0.26
4.3	1.3	0.16
5.0	1.0	0.08
5.3	0.3	0.025

For example a tide rising 15 ft, 2 hours after High Water, would be 15 × 0.75=12 ft. above low water, or on the rising tide 2 hours after L.W. 15 × .25= 4 ft.

More than one large vessel has been battered to pieces by neglecting these reductions, anchoring at high tide, and being left high and dry at low water.

Others have anchored at low water, lifted their anchor as the tide rose and drifted ashore, and many a vessel, large and small, has been misled and got into trouble by comparing their casts with the chart without making corrections.

The Lead

Singularly enough, the lead, the simplest device used by the navigator, is the most essential yet so often neglected. In no class of mariners is it more neglected than among motor boatmen. They seem to depend too much on seeing the bottom or otherwise detecting shoal water. This is unseamanlike, at least, and often leads to serious inconvenience and sometimes to disaster. Navigators in general omit the use of the lead, not through the desire to avoid the trouble of sounding, but through an over confidence in their position. In this connection it is always well to bear in mind an admonishment to the navigators of His British Majesty's vessels, directing them not to know their ship's position, lest through an unwarranted confidence they are led into dangerous waters. But rather with all available evidence at hand be always on the alert for more information to refute or confirm their position.

The ordinary hand lead line comprises nine marks and eleven deeps. The latter being the term given to the fathoms having no marks. The lead line is marked as follows:

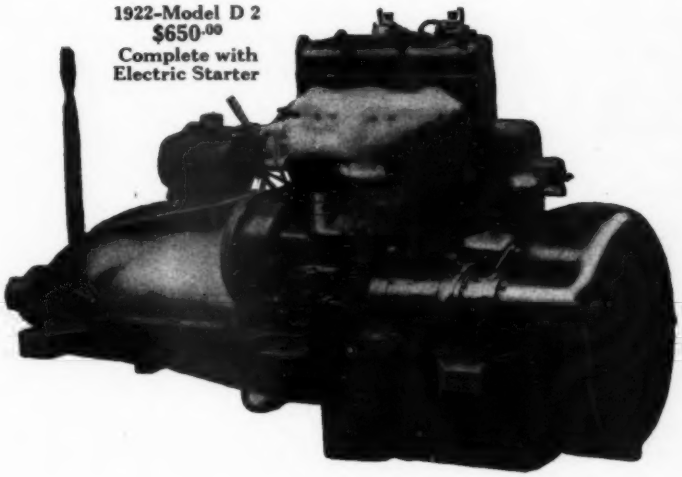
Two fathoms from the lead.....Two strips of leather
Three fathoms from the lead.....Three strips of leather
Five fathoms from the lead.....White rag
Seven fathoms from the lead.....red rag
Ten fathoms from the lead.....leather with a hole
Thirteen fathoms from the lead.....three strips of leather
Fifteen fathoms from the lead.....white rag
Seventeen fathoms from the lead.....red rag
Twenty fathoms from the lead.....cord with two knots

It is essential that a line be soaked in water before marking it owing to the contraction of the material.

(*Continued on page* 176)

Scripps

1922-Model D 2
$650.00
Complete with
Electric Starter



In order to show the world the reliability of our motors we built "The Detroit," a 35' x 8' motor boat, equipped with a 12-15 H.P. SCRIPPS MOTOR, and ran her, under her own power, every inch of the distance from Detroit, Michigan, to St. Petersburg, Russia (now Petrograd). The start was made from Detroit on July 2, 1912. She arrived in St. Petersburg September 13, 1912—6008 miles with ABSOLUTELY no trouble. Ask Thomas Fleming Day, her skipper, or Walter Moreton of Boston, they will tell you. No other manufacturer has dared to attempt a similar demonstration of reliability. A Scripps Motor will run when nearly upside down, as demonstrated by Larsen's trip through the Niagara Rapids in October, 1911. Do these wonderful demonstrations of reliability and stamina mean anything to you?

Ask Yourself—

Do I want a real marine engine—made by a well known manufacturer that has had the time tried experience necessary to the development of a marine engine and in that business to stay? Or will I be penny wise and take a chance with something else intended for an entirely different field where its failure to make good or sell now forces its makers to dump it on the unsuspecting motor boating public with eleventh hour alterations supposedly fitting it for marine work?

Performance, not Promise, Has Made the Scripps

You can't navigate very far on a gambler's expectations. "Safety at Sea" is more important than "Safety First" on your streets. You can't be too careful in selecting your power-plant—make sure you're not running an experimental department for something new or untried, or that is baited with little more than a low price inducement. In marine equipment there is nothing so expensive and disappointing as makeshifts or cheapness from the standpoint of economy, safety or enjoyment. It will cost you little more to install a Scripps and experience real lasting satisfaction.

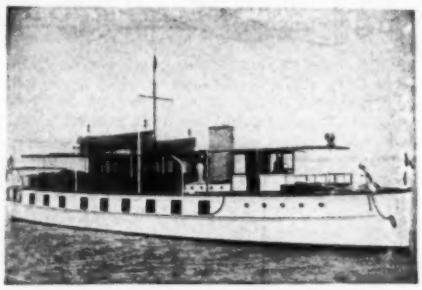
For seventeen years Scripps engines have never failed to live up to their reputation of being unusually fine engines—a more reliable or adaptable engine has never been built—because in all these years the Scripps Organization has followed steadfastly but one ideal, and that to build better. A good engine cannot happen over night. Years of toil and honest endeavor have made Scripps reputation world wide. Its quality, endurance and reliability are as well known to the motor boating public over-seas as at home, and wherever yachtsmen congregate Scripps performance is a by-word. With the ruggedness and absolute dependability that have built Scripps reputation in the past are linked the exacting refinements and other motor conveniences of the present.

Your boat will mean a whole lot more to you with a Scripps installed. Investigate, two, four, and six cylinders, 10 to 125 H.P. gasoline or kerosene.

SCRIPPS MOTOR COMPANY

5819 Lincoln Avenue **DETROIT, MICH., U. S. A.**

"Every Moving Part Enclosed"



IN FLORIDA—OR ANYWHERE

a trim, roomy houseboat like our Luneta, built for Col. S. L. H. Slocum, Washington, D. C., would create admiring interest in her every port of call.

Add One More Florida Season

to the roll of Mathis triumphs—continuous year after year since the appearance of the first Mathis-built Houseboat back in 1909.

Continuous triumphs, because each year has seen new features—which added more comfort, more convenience and greater ability to go anywhere—included in

MATHIS-BUILT HOUSEBOATS

While in Florida, grasp any opportunity you may have to inspect one of the Mathis fleet at close range. It will make apparent why they have been the personal choice of some of the best known people in America.

MATHIS YACHT BUILDING CO.

Specialists in Houseboats and Cruisers from 40 to 120 ft.

Cooper's Point **Camden, N. J.**

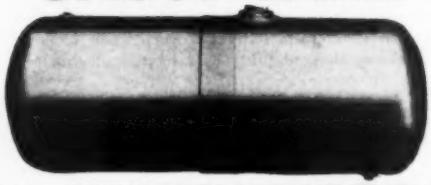
GAS TANKS

HE FEARS NOT SPARKS

whose motor boat is equipped with a

"JASCO TANK"

SEAMLESS



LEAKLESS

ALL SIZES—QUICK DELIVERY

NEW BOOKLET NOW READY FOR BOAT DESIGNERS & BUILDERS

JANNEY, STEINMETZ & CO.

1421 Chestnut St. Philadelphia **30 Church St. New York**

Gar Jr. As An Ice Breaker

(*Continued from page 23*)

unnecessary except when attending to duties on deck.

The run down the river and across New York Harbor was made in almost less time than it takes to tell it. Passing whistle signals to other craft were unnecessary as we had so much more speed than the others that we just darted across their bows or astern of them without effort. We ran inside of Staten Island, through the Kills and then up the Raritan River to New Brunswick, a total mileage from the Columbia Yacht Club of forty, which we covered in very quick time.

As we obtained our clearance at the entrance to the canal at New Brunswick we received our first shock. A government tug coming out of the canal hailed us, "Going through?" "Well, you want to be good at ice breaking." Further questioning brought out the information that the canal was frozen solid for many miles and that the tug had required all morning to make a short run. Of course, the tug had broken a passage through but this might freeze again any moment.

Now, Gar, Jr., was designed to make speed, not to break ice. Her mahogany finish was in the best of shape and all on board looked as one person down toward her sharp but graceful, yet delicate bow. A council of war was hastily called—should we return and try the 300-mile outside run or should we take a chance with the ice? The latter program was decided upon as so far in her career nothing had ever stumped Gar, Jr., and conquering ice fields would be further laurels to add to her crown. Therefore, "Let's go," it was decided.

Before getting underway even in the canal we located a lumber yard and procured a piece of maple planking about fourteen feet long by twelve inches wide. As the first ice to be met was thin, probably about one-half inch thick, and had been broken up by the tug, we thought we'd experiment a little to see how Gar, Jr., was able to push through it. We found that there wasn't any trouble from this source for the cruiser just went along as though there weren't any obstruction at all, cutting through it like a razor, and occasionally pushing a big sheet of ice high up on the banks of the canal before it had time to break into a million pieces. The faster the boat was speeded up and the higher she rose in the water, the greater was the destruction of the ice field. It was a great sight to be way up in the bow of the boat and look down and see the ice being broken into a countless number of small particles, each one trying to beat its neighbor in rapidity of getting out of the way of the on-rushing monster. No ice breaker designed especially for that purpose could have accomplished its object more effectively.

We kept up our ice pushing until we reached the next lock only a short distance ahead and there decided that it would be best to make up some sort of an ice breaker to attach to Gar Jr.'s bow so that the brunt of the ice's force would not come against the bow planking. So we took the maple plank and cut it in half and mitered the pieces together at one end into a V-shape piece. We then made this fast to the bow by means of lines to the deck and again started on our way.

The ice breaker worked to perfection. We no longer had to slow down for fear of injuring the bow planking. Most of the ice was broken and floating and was pushed aside with very little apparent effort. The effect upon the speed was not noticeable, neither was there any vibration.

As we approached the City of Trenton at dusk the ice entirely disappeared so we thought our troubles were over and took in our plow. We had dinner at Trenton which is only six miles from the terminus of the canal and then decided to push on toward the Delaware so as to be ready for an early start the following morning. We had only made a half mile, or thereabouts, when new troubles began. To the eastward of Trenton the canal had been kept fairly free of ice by considerable navigation but we found that to the westward no boat had passed through for several days. The ice here was not only not broken up but was frozen solid. We had to again put the plow in place but even this was not sufficient as it was not high enough and the ice would crawl over the top of it and strike the planking with great force. It was pitch dark so after about 100 yards of this kind of sailing we decided that we had had enough of it so decided to remain for the night just where we were. And no anchor or lines to the shore were necessary either. When the sun came up in the morning we had a chance to look over the situation and it was rather discouraging. There apparently was four miles of solid ice ahead of us, before we could reach the free waters of the Delaware. Astern of us was forty miles of canal. There was not much to choose between the two except that it was certain that the only thing to do was to push on, ice or no ice. To do this would require a better ice breaker and to provide this wasn't such an easy matter in the wilderness where we were. We walked back on the tow path a mile or so to the nearest lock tender's house and there bribed the occupant to let us tear apart a wrecked boat which was hauled up on the canal bank. We decided that the two sides of the boat's trunk cabin would be just right for an ice breaker if attached to the one we al-

(Continued on page 188)

Hacker-Craft

A New Hacker Craft, 25-Footer, for 1922

SPEED 25 MILES

A NEW high-class outfit, right up to the minute. Tested and proven a dry, safe and seaworthy proposition. The motor is a Model-D, 4-cylinder Scripps, allowing a speed range of from 2 to 25 miles —economically. Seats seven comfortably. Delivered complete in every respect. Ready to run. Production will allow this outfit to be sold at a very popular price.

26-Foot Hall-Scott Special

We are building a number of 26-foot boats, designed especially for the Hall-Scott motor. These will be first-class all mahogany jobs. Equipped with special fittings throughout. We will be glad to furnish you with a hull complete, ready for motor, or will take your motor, have same converted into a marine motor, and deliver to you complete and ready to run. This is your chance to procure a real up-to-the-minute outfit, at a real production price. This job will qualify for the Gold Cup Race. Speed from 32 to 35 miles. Full particulars upon application.

Special Outfits

We are prepared to figure with you on any kind of a high-class runabout, sedan or limousine proposition. Speed guaranteed, and Hacker-standard quality. Prints, specifications and price upon knowing your requirements. Satisfaction guaranteed.

21-Foot Standards

Have a number of 21-footers with or without power plant at a special price. Immediate or spring delivery.

Hacker Plans

Send for the new Hacker book of plans before deciding on your next boat. Brimful of up-to-date high-class designs.

HACKER BOAT CO.

1525 Crane Avenue **Detroit, Mich.**

The Mystery of the Screw Propeller

(*Continued from page 38*)

and V_1 the speed AD with which the propeller advances through the water in which it works, we have the relation

$$\text{wake fraction } w = \frac{DB}{AD} = \frac{V - V_1}{V_1}$$

and by the aid of a little arithmetic, this becomes

$$V = V_1 (1 + w).$$

When a vessel is towed through the water it offers a certain resistance to motion called the tow-rope resistance because this resistance is usually determined by towing a model in an experimental tank. When the vessel is driven by its own propeller, the propeller has the effect of sucking the water away from behind the vessel, which is equivalent to increasing the resistance of the vessel to motion through the water, also the angularity of the currents entering the propeller reduces the propelling effect. Therefore, in order to propel a vessel through the water, the thrust of the screw must be greater than the tow-rope resistance of the vessel.

Call the thrust of the screw T; the tow-rope resistance R; and let t denote the percentage of increase in resistance due to the suction of the screw and deflection of the currents entering the propeller. Then we have

$$R = T (1 - t).$$

This fraction t is called the thrust deduction.

The actual work of propulsion must, of course, be equal to the tow-rope resistance R of the vessel times the speed V at which the vessel moves, i.e.,

$$\text{Work of propulsion} = R V.$$

Substituting the above values of R and V in this product, we have

$$RV = TV_1 (1 + w) (1 - t).$$

The word power in mechanics simply means the rate of doing work, or the amount of work done per second. The term RV, therefore, stands for the work of propulsion done per second, or, as it is usually called, the effective power. Similarly the term TV_1 is the rate at which the thrust of the screw is working in the water immediately surrounding it, and is called the thrust power. The factors $(1 + w)$ and $(1 - t)$ represent the effect of the hull on the action of the propeller, and their product $(1 + w)(1 - t)$ is called the hull efficiency. For example, for a 10% wake and 10% thrust deduction we have $1 + w = 1.10$ and $1 - t = .90$; consequently, the hull efficiency in this case is $(1.10)(.90) = .99$ or 99%. Without going further into this question, it is at least apparent that the form of the hull is an important factor in propeller design.

The other fundamental condition determining the size and form of propeller is, of course, the characteristics of the motor which drives it. An engine of any type works most efficiently over a limited range of speed, and it is therefore necessary to design the propeller to suit the most favorable speed of the motor, and such that the torque power required to turn the propeller at this speed shall be exactly equal to the power developed by the motor at the same speed. Otherwise, the motor and propeller will either speed up or slow down, and in consequence will pass out of the most favorable range either of engine performance, or propeller performance, or both. This consideration ought to make it clear that it is foolish to expect satisfactory results when a propeller is selected by guess from stock patterns, as the odds against guessing exactly right are about a million to one.

It is generally known that when a propeller is overloaded, or when it is too near the surface, cavitation may be expected to occur, and no one need hesitate to admit that this is about all he knows regarding cavitation for it is practically all that anyone knew about it until comparatively recently. By cavitation is meant the formation of cavities, filled with air or vapor, on one or both sides of the propeller blades. When this occurs, the thrust, of course, drops very rapidly, as the propeller is no longer working in a medium of the same density as before. The only cure which propeller manufacturers seem to have found for cavitation so far is that of increasing the area of the propeller, which usually means increasing its diameter. This change, however, affects the propeller torque and therefore upsets all previous calculations.

The subject of cavitation has been carefully studied both experimentally and theoretically during the past ten years, and considerable information is now available. One experimenter has made a very extensive series of stereoscopic photographs of propellers working in water, and the results of his investigations seem to be the basis for the method of surface propulsion now widely advertised. From theoretical investigations it has been found, however, that by slight changes in design, more particularly in the trailing edge of the propeller, the point at which cavitation occurs, may be raised to a much higher speed than for the present standard type of propeller.

The present method of propeller design is based almost entirely on experience, and consists largely in slight modifications of existing types which have proved satisfactory. The main features of design are determined arbitrarily, the blade section and contour both being assumed at the outset. The ratio of the projected area of the blade to the area of the propeller disc is then made to lie within certain prescribed limits, the most favorable value for this ratio as determined by experiment being about .2. The lower limit for the diameter is based on the condition that the thrust per square inch of developed blade area shall not exceed a definite amount, usually assumed as from 12 to 16 lbs., while the upper limit for the diameter is determined by structural conditions and the torque power of the engine. This work is largely a matter of drafting room procedure, and with this routine so thoroughly established, there is little opportunity for improvement beyond that existing within the range of standard designs. At most, this method of individual design is only applied to large and important vessels. In motor boat practice, the builder simply selects from stock patterns the propeller which, in his judgment, is most likely to prove satisfactory.

The theoretical basis of propeller design so far as it follows rational methods is the so-called impact theory. By this is meant simply that the impact of the blades striking the water pushes the water backward and thereby creates the thrust which drives the vessel. There are several well known facts, however, which the impact theory is powerless to explain. In the first place, experiments in aeronautics have proved that propeller action depends very little on the pressure exerted on the so-called pressure side of the blade, but is due largely to the decrease in pressure produced on the opposite or suction side of the blade. A second well known fact is that when a propeller is working properly, that is, in accordance with the conditions for which it was designed, the angle which the inflowing fluid makes with the pressure side of the blade is either zero, or at most not over two or three degrees, and consequently the impact of the fluid against the blades cannot be a large factor in producing thrust, as the impact theory requires.

A rigorous theory of propeller action must be based on the laws of fluid flow, usually called hydrodynamics. It is intended to keep this article within popular limits, but to avoid misunderstanding it seems absolutely necessary to explain the technical meaning of the term hydrodynamics. Probably this term is usually thought to mean the same as hydraulics, that is, anything associated with water. Its scientific meaning, however, is very different, and is limited to a very definite field. Hydrodynamics in this connection means the study of the flow of fluids based on Euler's differential equations of motion, and proceeding by means of conformal representation to map the lines of flow and pressure distribution in the fluid, finally arriving at recent special developments as applied to propeller action, such as the circulation around a single blade, the composite flow around a succession of blades, the study of vortex motion, and of surfaces of discontinuity, and many other results which it is not necessary to mention.

This subject is not so formidable but that everyone can

(*Continued on page 184*)

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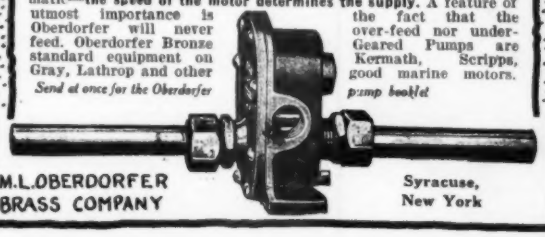

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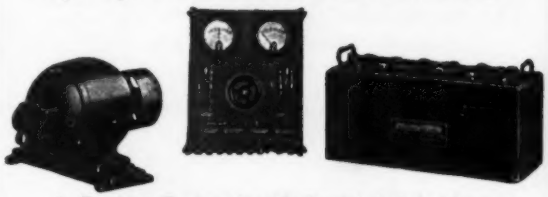

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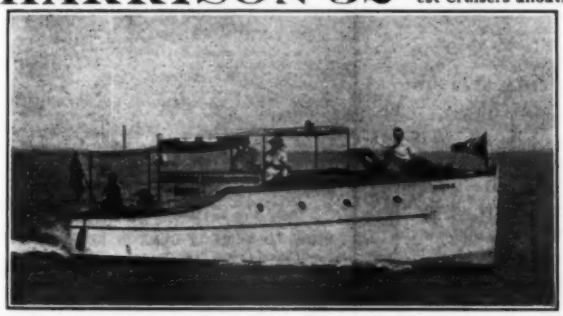

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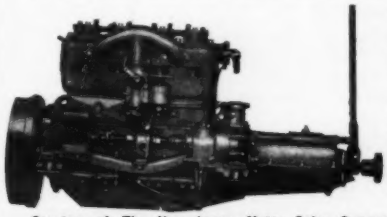

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H. A. Tarantous

Managing Editor
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Simple explanation of the battery system. How to locate trouble.

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How to protect the cooling system. Care of the battery. The reasons why an engine starts hard in zero weather.

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Cleaning of plugs, setting the gap, cause of fouling, etc. The work a spark plug has to do and the common causes of plug failure.

HOW VALVES FUNCTION
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Simple explanation of the construction and operation of a battery and the reasons for giving it certain periodic attention.

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Simple things many drivers often forget. How to make a quick stop, how to avoid skidding on wet or snowy pavements. Driving on steep grades.

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HOW TO PREPARE YOUR CAR FOR TOURING
What to do in case of trouble on the road. Simple things you often forget to do before starting on a journey. Driving at night.

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Relative failure due to poor design, poor workmanship, lack of care and understanding. Importance of proper lubrication.

HOW THE VACUUM FUEL SYSTEM WORKS
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Explaining the different types of system, their care and adjustment.

HOW TO REMEDY CLUTCH TROUBLES
Usual causes of slipping, grabbing and chattering, with special reference to the relation between alignment and chattering.

HOW TO TUNE UP YOUR CAR FOR THE SEASON
First steps. What to do next. The best ways.

Advertising Index will be found on page 192

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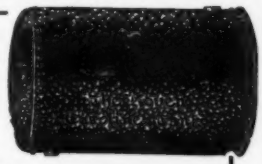

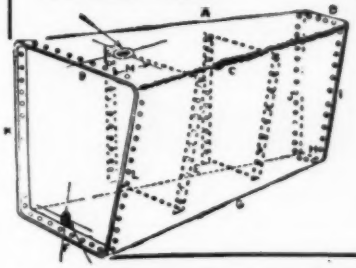

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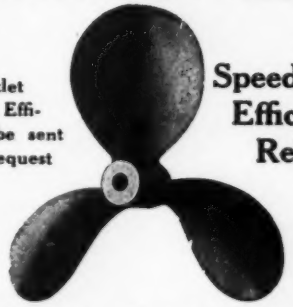

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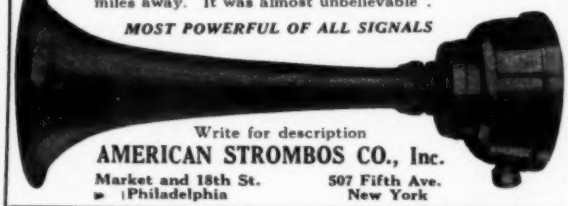

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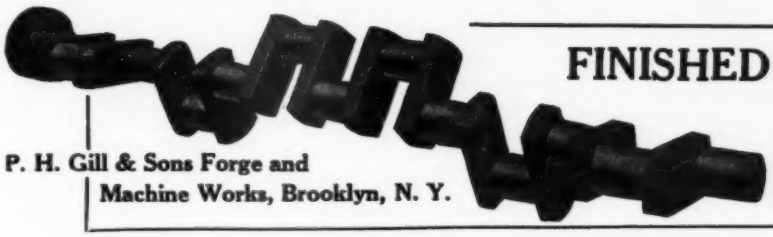

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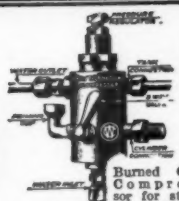

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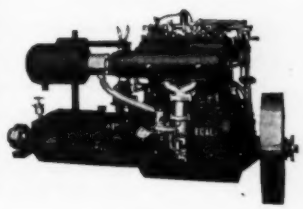

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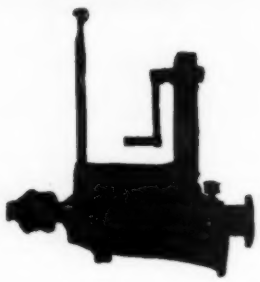

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The Mystery of the Screw Propeller

(*Continued from page* 178)

understand some of the results. Everyone who has rowed a boat is familiar with the little spiral vortices which form at the end of an oar when it is lifted from the water. These may be observed to maintain their shape for some distance behind the boat. The same thing can be observed at the tips of the propeller blades, and these little vortices running off the tips of the blades have actually been photographed for air propellers. The cause of these vortices is a circulation flow around the blade, and this circulation is the characteristic feature of the modern theory of propeller action.

The study of this circulation flow around the blade has resulted in establishing a very important principle, which states that with a circulation flow around the blade, the resultant thrust on the propeller is at right angles to the direction of fluid flow ahead of the propeller. It therefore explains fully what the impact theory could not, namely, why the thrust is greatest when the relative flow is practically tangent to the pressure face of the propeller blade.

Propeller action is therefore no longer a mystery but is firmly established on a rational basis. Within the last few years the circulation theory has been reduced to a practical working basis, and can now be readily applied to the design of propellers as well as to the analysis of their performance. Perhaps the chief feature of this new method is that it enables the designer to lay out a propeller to satisfy any given set of conditions with assurance that the predicted performance of the propeller will not differ materially from actual results obtained in service. It also makes it possible to analyze propeller performance and determine what changes in design will better the efficiency of existing types, as well as to develop a new type which shall fulfill the conditions for maximum efficiency. The new method of propeller design should therefore be of great interest to motor boatmen, as refinements in detail of hull and engine design are far in advance of propeller construction and performance.

The Journey's End

(*Continued from page* 168)

in the fitful periods of sunshine which break through the August rain clouds, in painting deck and cabin, and in placing equipment in dry storage. Then when Hippocampus was stripped of everything portable her energetic little motor snorted for the last time and chugged her to a mooring off the lighthouse depot. There she rests, saucy and trim as when she first took the water, awaiting my return in June. While three thousand miles of her native element separate her from me, she is brought constantly to the foreground of my mind by the written assurances of my Canal Zone friends that "Hippo is O. K."

So also are the resourceful, energetic and companionable shipmates who helped me sail her to the Zone. Both Squibb and Chambers, responding to the lure of tropical life, have turned their backs on the winds and vicissitudes of northern existence.

Squibb, again a landsman, but with the firmly established reputation of a sea dog, is surveying for an oil company in the Colombian jungle. Chambers, always the rover and the adventurer, has cast his lot with our engineering friend Davidson, and at last accounts was heading for the upwaters of a great South American river, there to search for gold and diamonds.

Hippocampus owes them much, but when I last saw her pirouetting at her mooring she wore the righteous air of one who gives as good as she receives.

The Way We Would Do It

(*Continued from page* 43)

It is apparent that your rudder needs to have some of its blade area forward of the rudder stock. In your case this can be very easily done by punching out the rivets which hold it in place. The blade should simply be moved and refastened so that about twenty per cent of its area will be forward of the rudder stock. We would suggest that about three inches of the blade be allowed to project forward and that the blade be then re-riveted into place. The total area of the blade is sufficient and relocating it as suggested will tend to make the boat turn better with less strain on the steering gear and tiller lines.

Advertising Index will be found on page 192

CHAS. CORY & SON, Inc.

CORY SAFETY SERVICE

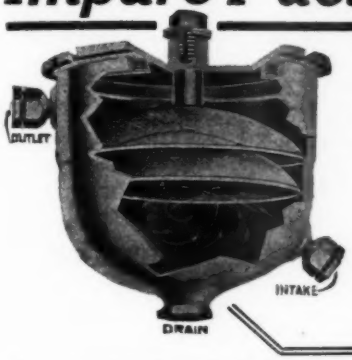
183-7 VARICK ST. NEW YORK, N. Y.

YACHT & POWERBOAT EQUIPMENT

Mechanical Telegraphs	Rudder Indicators	Signalling Lights
Telephones	Gongs, Bells	Signalling Sets
Voice Tube Fittings	Lighting Fixtures	Howlers
Annunciators	Wiring Appliances	Fire Extinguishers
Electrical Telegraphs	Running Light Panels	Fire Alarms
Shaft Indicators	Running Lights	Ramsay Anticipating Governor
Whistle Control	Switchboards	

WRITE FOR FURTHER INFORMATION & CATALOG BULLETIN

Impure Fuel Due to Water! KLEENGAS PURIFIER



Fully 90% of your carburetor trouble is caused by water and dirt in your fuel. You can prevent this trouble entirely with a KLEENGAS PURIFIER.

You can't prevent water from collecting in your fuel tank and line—it condenses from damp atmosphere as well as the water in the gas or kerosene you buy. You can't prevent sediment, dirt, fluff, rust, impurities—some scales off the tank lining—some comes in the gasoline itself. But you can prevent all the troubles caused by these impurities.

KLEENGAS is a high grade PURIFIER scientifically designed, simple in construction and made of the best non-corrosive materials. Aluminum bowl, double parabolic fine mesh bronze screens, brass drain tap at bottom. It cleans itself by the swirling motion, the impurities dropping down so they don't clog the screen. Large capacity allows full gas flow and requires only occasional draining.

Order a KLEENGAS today—$10.00 postpaid. Money cheerfully refunded if not as guaranteed. Hundreds in use. Easily installed—no soldering.

Excellent proposition for distributors and dealers—write

THE NATIONAL AUTOMOTIVE MFG. CO.

822 CHAMPLAIN AVE., N. W. - - - CLEVELAND, O.

DON'T BUY A BOAT

Until You Have Seen Our Exhibit of Motor Boats, Sail Boats, Row Boats, and Especially Our One Design Class Baby Knockabout, on Exhibit at the New York Motor Boat Show, Grand Central Palace, New York City, February 17-25, 1922.

MEMBER

Export Office:
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342 Madison Avenue,
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CAPE COD

SHIP BUILDING CORP.

SUCCESSORS TO

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WAREHAM, MASS.

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Standardized Boats and Craft
Up to 150′ Lengths
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BEEBEE BOATS

SPECIAL HIGH SPEED RUNABOUTS AND HYDROPLANES

16 foot 5 passenger runabout or yacht tender, speed 40 M.P.H.

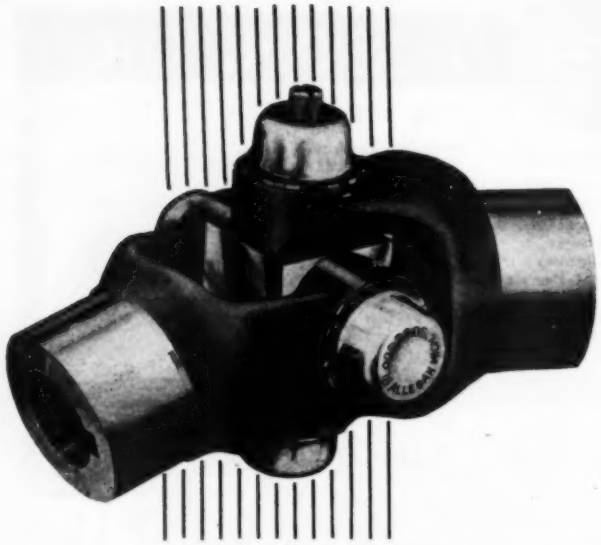
36 foot 10 passenger sporting runabout, 75 M. P. H.

Hydroplanes 80-90 or 100 M.P.H.

WORKMANSHIP, SPEED AND PERFORMANCE GUARANTEED

SYDNEY C. McLOUTH

MARINE CITY MICHIGAN



WE SHIP THE DAY
WE RECEIVE YOUR ORDER

MARINE JOINTS

MUST BE USED

On all angular drives.

SHOULD BE USED

On all straight-line drives when there is a possibility of future disalignment.

BEST BE USED

On all drives to avoid waste of power, constant checking of alignment, or both.

Blood-Brothers Model B joint is rugged and compact.

It has larger bearing capacity and will turn in a smaller circle than others.

It is easily lubricated through a single opening.

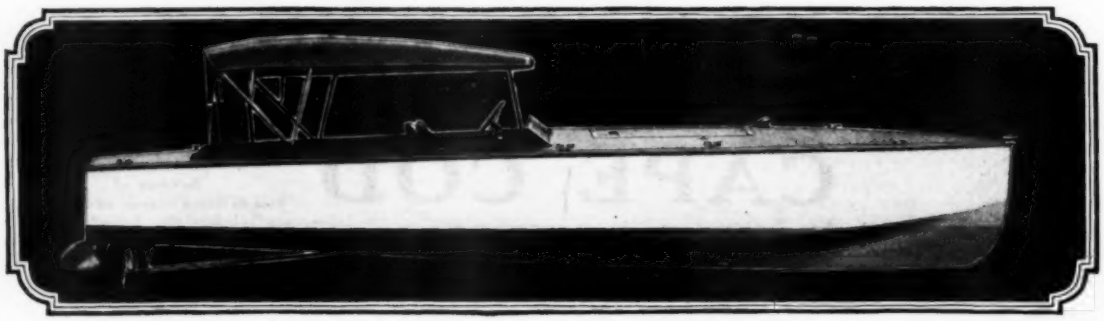
It does not throw oil and requires infrequent lubrication.

Made in four standard sizes.

Send for marine bulletin; it will interest you.

BLOOD-BROTHERS MACHINE CO.
Pioneer Builders of Universal Joints

ALLEGAN F. Somers Peterson, San Francisco, Calif., Western Representative **MICHIGAN**



Mullins "V" Bottom Boat — Keeps an Even Keel

No matter what the speed—regardless of how choppy the sea, Mullins newest "V" Bottom steel boat keeps an ever even keel. Will not roll or upset.

Developing more speed per H.P., remaining drier when under way and being steadier to pilot, the "V" bottom boat has many advantages over a round bottom boat. Lighter in draft, the "V" bottom is in less danger from shoals and shallows.

Mullins boats are safe as life boats—air compartments, fore and aft, insure permanent buoyancy. The steel hull retains its shape and remains smooth. Cannot spring a leak—no seams to open. No calking necessary. Can't warp, dry out, rot or waterlog. No boathouse needed. The upkeep is low. Powered with the finest marine motors.

MULLINS STEEL BOATS CAN'T SINK

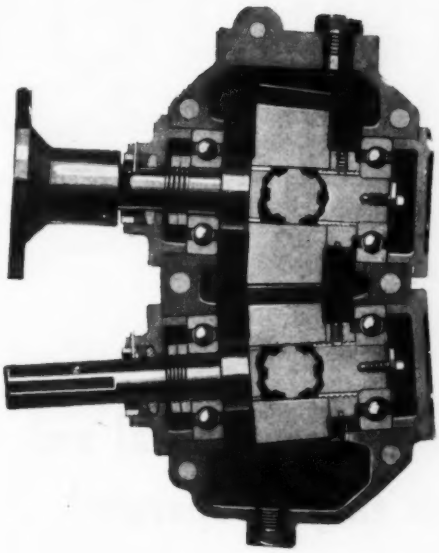
Mullins boats are designed and built in the world's largest boat factory. Known and used for 26 years on the waterways of all nations. Over 50,000 now in service. Write for complete description of the Mullins "V" bottom boat. On request, we will mail new catalog, showing many models of power boats, rowboats and canoes.

THE MULLINS BODY CORPORATION
Boat Department
644 Depot Street **Salem, Ohio**

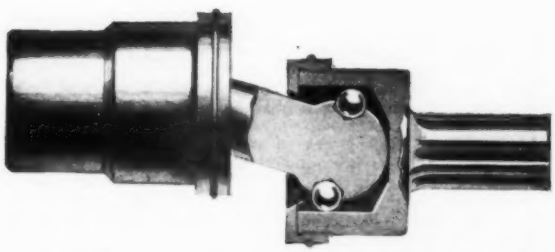
Advertising Index will be found on page 192

Gear Boxes

For Racing Hydros and High Class Runabouts



Ball bearing throughout. Generated Teeth. Greatest Efficiency. Sizes up to 1000 H.P. and 2000 R.P.M. Either angular or straight.



CROSS, 99% efficient, Ball Bearing Universal Joints. The smallest diameter joint on the market. Made in a variety of combinations and sizes to transmit 1000 H.P. at any motor speed.

CROSS Reverse Gears for all high speed, high power motors.

These articles of equipment are used and recommended by the best builders in the country.

Write us about your installation problems. We can solve them for you.

Cross Gear & Engine Company

3255 Bellevue Avenue Detroit, Mich.

Note the simplicity of the L-A Rowboat Motor —note its sturdiness. Here is a man's motor— heavy enough to be strong and durable, light enough to be easily transported

Speedy, economical and so easy to operate!

SPEED that gets you there and back in a jiffy—6 to 8 miles per hour on an ordinary rowboat.

Economy in gas consumption—at least 12 miles to the gallon of gas.

Simplicity of operation—you don't need to be a mechanic to run the L-A.

Reliability—strong and sturdy, and always dependable.

These are the features which give the L-A Rowboat Motor its popularity with vacationists, picnickers, fishermen and hunters. For the L-A Rowboat Motor is built to give *service*—and to the recreationist and amateur sportsman service means *speed* and *economy*, *simplicity* and *reliability*.

If you are not posted on all the merits of the L-A Rowboat Motor write for full information today.

Learn why the L-A is rudder-steered, why it has a built-in gas tank, why its magneto is so powerful. Write for the facts today—you'll be glad to know the L-A Rowboat Motor better.

LOCKWOOD-ASH MOTOR CO.

2207 Jackson St. Jackson, Mich.

LOCKWOOD-ASH
MARINE ENGINES

Removable Spray Guard

(*Continued from page* 41)

cabin top, but flat on the upper side, was screwed to the deck just forward of the bulkhead and the windshield frame attached to this by means of two or three heavy strip brass clips and brass bolts and nuts.

Two braces made of three-eights-inch galvanized rod were fastened to the forward edges of the frame and extended down to the deck. Here two brass plates were screwed on, the rod ends being threaded, and attached, by means of brass machine screws, to two similar plates screwed to the deck. The machine screws were screwed into the fixed plates and slots in the upper plates permitted of quick removal after slightly loosening the screws.

H. H. P., Oakland, Cal.

Hauling Out Made Easy

(*Continued from page* 42)

casters make the rig suitable for heavier boats and more of them.

As the size and number of boats increases a rig approaching the large marine railway is necessary. Smaller car wheels may be purchased separately or shrunk on axles as desired, and most any discarded trolley rails or industrial rails will be suitable. These may be purchased from dealers in used construction equipment, or, perhaps, picked up around the junk yard. The wheels integral with the axles are preferable for a number of reasons. The car construction is simpler and the car is not as apt to jump the track. The axle is not apt to bend under a heavy load, and the wheels, being fast, cannot wobble and rub against the side of the car, as is the case with loose wheels.

A car 20 feet long will handle easily boats up to 35 feet. For this size boat the sides should not be smaller than 6 by 6 inches, of yellow pine or spruce. The wheels run inside the stringers, which should be spaced accordingly by pieces of the same timber, at the center and 18 inches from each end. End spreaders are mortised and tenoned and the center bolted. Alongside each spacer bore the stringers and place rod threaded at each end to hold the frame securely together, and cross brace each section with angle iron, pipe, or wood. Over each end spacer bolt a 4 by 6 inch piece 10 feet long upon which to slide the chocks.

The chocks are made of 3 by 6 inch stock to conform generally to the underbody of the boats, and are held on their bearing timbers by bolts through plates at the high end guide plates at the other. Ordinarily only two chocks on the after bearing piece will be needed. Chocks are adjustable.

To attach the wheels, bolt on just inside the spreaders, babbited shaft bearings, of a size suitable for the journals. Hardwood bolts will be all right, but they run harder. Where the water is exceptionally shallow the bolts may be placed on top of the frame.

Bore the ends of the stringers, or, better still, bolt on iron plates, for attaching a chain bridle for hauling on. This car will require several hundred pounds of ballast to overcome its buoyancy. Lay pieces of old rail, shafting, etc., across it or board over the bottom and fill with stone or scrap iron. The additional weight will not be noticed when hauling. Friction due to faulty construction and track laying will use up more power than is required to haul several times the weight necessary to hold the car down.

Start laying the rails at low tide, and as they are spiked to the ties and the ties cross braced with old lumber to prevent twisting until the ties have settled in the bottom, push them out and continue laying for required distance. A six by six across the top of the rails at the outer end will prevent the car from going too far. The rails must be carefully spaced so that the wheel flanges will not bind or the wheels jump the track. Lay the track straight and lute down the bank to avoid a steep haul. Old trolley rails will be found to give good service, and owing to their weight will sink the ties so that there will be no shifting of the track. For track above high water 3 by 4 inch timber with ¼ inch by 3 inch flat iron strips screwed to them to prevent wear and allow easy running may be used.

W. B. M., Newburgh, N. Y.

Gar Jr. As An Ice Breaker

(*Continued from page* 174)

ready had. So we carried these back to where Gar Jr. was held fast in the ice and proceeded to reinforce the plow we had used the day before.

Some of the illustrations will show the breaker. It worked to perfection. At first we ran slow, then faster, and then still faster. Soon we were hitting better than 25 miles per hour and running through an ice field which one minute was a solid sheet and the next was an ice storm, showered down upon the waters of the canal, astern of our course. Had it been raining ice the effect could not have been more realistic. The four miles took about eight minutes and then Gar Jr. was locked down into the waters of the Delaware and passed away from the ice of the cold north, and to the beginning of the waters of perpetual sunshine.

Advertising Index will be found on page 192

1922

A Strictly Designed Marine Motor
10 to 25 H. P.

Gray

VALVE-IN-HEAD MOTOR

The Motor News of 1922 —

Better in every detail—Better as a whole—

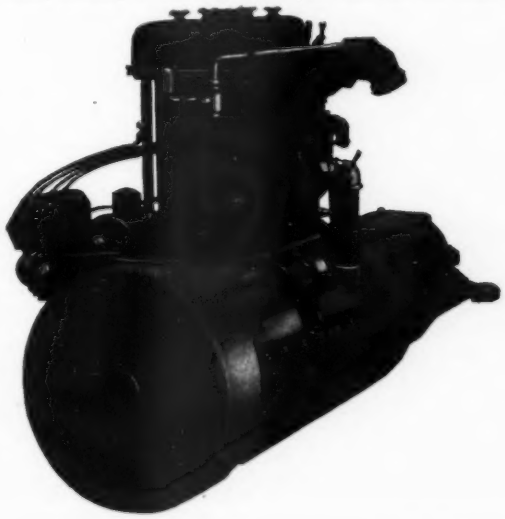
THE 1922 Gray is neat in appearance, compact, and can easily and inexpensively be installed in runabouts 20 to 30 ft. in length; small cruisers up to 34 ft., also work boats. Note the rigid one-piece base with reverse Gear enclosed.

The Gear is automatically lubricated with positive gear pump that lubricates all other internal working parts of the engine—no grease cups or thick transmission oil used.

Oil filler is conveniently located on top of engine with duct leading to Crank Case. Rocker arm shaft is hollow and automatically supplies oil to Rocker Arms. Oil is forced under pressure to the three main bearings, and to the connecting rod troughs.

In brief, the Gray Oiling System leaves nothing to chance. It is unfailing at all engine speeds, and all oil is kept inside the engine, and not thrown around the boat or on its occupants.

The fly wheel is enclosed, affording *safety* and *cleanliness*. Bilge water cannot be thrown by the fly wheel. Every working part is enclosed; even the push rods. Due to the special design of the Cam Shaft, push rods and rocker arms, scarcely a sound can be heard with the ear close to the engine.



Its smooth, quiet operation at all speeds from 200 to 2000 would compare favorably to an electric motor.

This Gray Improved Valve-in-Head operates most economically on the low grade gasoline and satisfactorily on kerosene.

The diameter of the main bearings are:

Front 2⅛". Center 2 1/16". Rear 2". The lengths are 3⅜", 2½", 2½" respectively.

Crank Shaft is 40-50 point carbon steel forging, heat treated and ground.

Special attention is given to the balancing.

The shaft is put in rotative as well as static balance on an Akimoff Dynamic Balance Machine, reducing vibration to a minimum.

Bosch Magneto with Impulse Starter, also Bosch two unit Starter and Generator is used.

Gray Two-Cycle Motors are built in models from 3 to 8 h.p.

Write for FREE literature

Gray Motor Corporation

2106 Mack Ave. **DETROIT, MICH.**

America's Finest Runabout

Will be on exhibit at the New York Motor Boat Show.

BE sure to attend and let us show you the many superior features of these famous runabouts that have set a new standard for Motor Boats during the past year.

Our exhibit will include other models of

BELLE ISLE BOATS

ranging in price from $250.00 up.

BELLE ISLE BOAT & ENGINE COMPANY

DETROIT, MICHIGAN

Builders of the "Davis American Dingheys."

Yard and Shop

(*Continued from page 64*)

New Yacht Club Building

The Capital Yacht Club at Washington, D. C., has appointed a committee to formulate plans for the acquisition of a site on the water front at the foot of Eleventh Street, S. W., on which it is planned to erect a new club house. It is also contemplated to install a complete marine railway here for the benefit and convenience of the club members.

Commodore Gar Wood Reelected

Commodore Garfield A. Wood, national and international motor boat champion, was re-elected commodore of the Detroit Yacht Club, at the annual meeting, on Jan. 9. The attendance at the meeting set a new record for the club, more than 500 out of the 2,084 members in good standing turning out.

While the D. Y. C. is world famous for its power boats the directors' proposals regarding the sailing activities in 1922 met with the approval of the membership. The Cat Boat committee requested not less than three and five new cat boats if possible be purchased. The directors announced the authorization of 10 new cats, giving the club the largest fleet of club owned cats on the Great Lakes, a total of 26, in addition to the numerous privately owned boats in the fleet.

Commodore A. A. Schantz, chairman of the building committee, reported that the contracts for the new $500,000 club house, on the new island off the Belle Isle shore, had been let and that the new club house would be opened in the spring of 1923. He also announced that the 500 foot veranda would be ready in the fall for the members to use as a grandstand to view the Gold Cup and Harmsworth Trophy races.

Commodore R. W. Rennie, as treasurer, showed that the club was more prosperous than ever in its history having cash assets of $312,000. A plan for a sliding scale of initiation fees for the next 1000 members was approved. The first 200 pay $250 and this is increased $50 for every 200, which will provide a sufficient fund to complete the club house without selling additional bonds to the membership.

In the election of flag officers, Rear-Commodore George H. Voelkner was re-elected. Vice-Commodore C. D. Cutting, Treasurer Commodore R. W. Rennie and Secretary William J. Fuehrer, were re-elected. Dr. C. S. Ratigan was elected fleet surgeon and L. K. Wood fleet measurer.

Palmer Brothers New York Office Moves

On and after February 1st the New York show room of Palmer Brothers Engines, Inc., will be located at 128 Lexington Avenue between 28th and 29th Streets. E. E. Palmer will be in charge as usual and will be assisted by Gustaf Blomgren who has been connected with Palmer Brothers for the past fifteen years. A complete line of sample Palmer motors will be shown and a complete stock of parts and supplies used with Palmer motors will be always on hand.

Sexton Motor Company Expands

In order to meet the demand for Enterprise Diesel and heavy duty marine engines in the vicinity of Washington, D. C., the Sexton Motor Company have been compelled to establish a branch in Washington which will be located in Suite 322 and 323 Star Building. This branch will be under the direct charge of Horace Ward, well known in the capital marine circles, and who is to act as Branch manager. The Enterprise motors will be introduced to the many government departments which have use for this type of machinery. The Sexton Motor Company further have arranged to distribute the marine motors built by the J. V. B. Engine Company of Akron, Ohio, in the territory of New York and Philadelphia. The business of the New York office will be carried on from 30 Church Street, New York.

Scripps Prices Dropped

Although the prices of Scripps motors had perhaps reached as low a figure as was consistent with production costs, the Scripps Motor Company of Detroit announces a drastic business revival policy. The public has delayed its purchases in every line of business on the excuse that prices are coming down. In order to kill this alibi the present D series of motors in two, four and six cylinder sizes, all with bore and stroke of 4¼ by 6 inches, have been cut in price to a new low point. The prices as announced for these will be for the two cylinder motor, $650.00; for the four cylinder, $1100.00, and for the six cylinder, $1500.00. This cost covers the motors complete with a two unit starting and lighting system, storage battery, magneto ignition and enclosed reverse gear.

The Gray Stock Cruiser Launched

The first of the Gray standardized cruisers was completed and launched on the afternoon of January 9th. In order to get the boat to the water it was necessary to cut through four inches of ice and clear a channel for the marine railway. In starting the Knox motor for a trial trip it was only necessary to turn it a few times before it started and ran well for several hours. Considering that the machine had been standing idle for five months this is very creditable. Trials were run against a good stiff breeze and tide while towing the small dinghy astern and a speed of 9.78 miles per hour was made while with the wind and tide the speed was 10.6 miles per hour.

New Boats Being Built

Down at Middletown, Conn., in the local boat building yard, are being constructed three new 36-foot express cruisers from the design of Claire which was published in MoToR BoatinG in the series by Wm. H. Hand, Jr. These boats are practically identical with the express cruiser Harpoon, owned by M. S. Cornell, Jr. They are being built as a result of the demonstrated success of Harpoon and their new owners, L. M. Brooks of Chester, Conn., L. P. Racke of Naugatuck, Conn., and Carlton E. Palmer of New York, will be well pleased with their performance.

Navigation Classes in New Haven

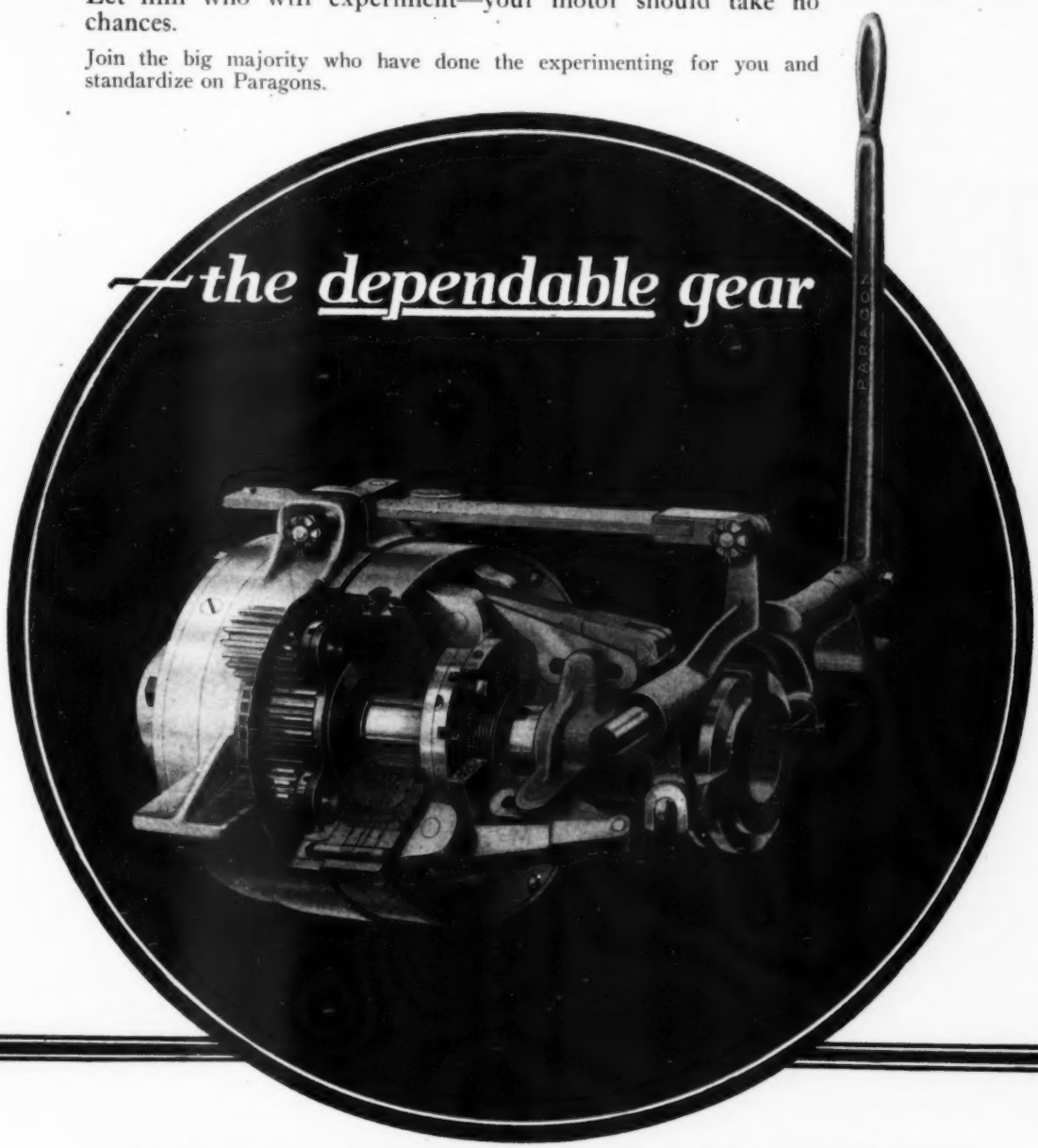
The Waucoma Yacht Club in New Haven is arranging a series of instruction classes covering the essential points of rules of the road, lights, whistles, the compass, and other kindred topics. These classes meet after the regular meeting on Tuesdays of each week and are under the care of Secretary Cooper. On Friday evenings Prof. Crum gives two hours of practical talks on the gasoline engine, and Jim can put over the problems so that a school boy can understand them. Diagrams are drawn and questions asked, answered, and discussed. Marine engines are taken down, refitted, and rebuilt. The Commodore of the club has extended a hearty invitation to all boat owners in the vicinity to enjoy the benefits of these classes. Other activities essential to a successful yacht club are also in full swing, among them a racing program which contemplates a number of interesting races.

PARAGON REVERSE GEARS

YOU who have seen marine motors and accessories come and go during the last decade will appreciate the time-tried *dependability* of the Paragon Reverse Gear.

Let him who will experiment—your motor should take no chances.

Join the big majority who have done the experimenting for you and standardize on Paragons.



PARAGON GEAR WORKS

CUSHMAN STREET, TAUNTON, MASS., U. S. A.

MoToR BoatinG Advertising Index

A

A. C. Electrical Mfg. Co. 179
Allison Engineering Co. 73-74-75-76
American Bosch Magneto Corp. 103
American Brass Co. 86-87
American Strombos Co., Inc. 182
Auto Engine Works. 152

B

Barker Factory, The 179
Belle Isle Boat & Engine Co. 190
Bissell Varnish Co. 169
Blood Bros. Machine Co. 186
Bosch Magneto Corp., Robert 89
Bowes, Thos. D. 64
Brennan Motor Mfg. Co. 158
Brooks Mfg. Co. 181
Brooklyn Varnish Mfg. Co. 108
Bruns, Kimball & Co., Inc. 61
Bryant & Berry Propeller Co. 183
Buffalo Gasolene Motor Co. 1
Burger Boat Co. 114
Burrows, Geo. R., Inc. 183

C

Caille Perfection Motor Co. 110
Caldwell & Co., J. E. 68
Cape Cod Shipbuilding Corp. 185
Carlisle & Finch Co., The 181
Carlyle Johnson Machine Co. 179
Carpenter & Co., Inc., Geo. B. 84
Clark Turner Piston Co. 193
Clay Engine Mfg. Co. 124-125
Classified Advertisements 59-60-62
Coes Wrench Co. 116-117
Columbian Bronze Corp. 157
Comet Electric Co. 130
Consolidated Shipbuilding Corp. ..4th Cover
Cory & Sons, Chas. 185
Cox & Stevens. 52-53-64
Crescent Motor Boat Co. 66
Crockett Co., D. B. 179
Cross Gear & Engine Co. 187
Curtiss Co., J. H. 182

D

Dawn Boat & Shipbldg. Corp. 138
Defoe Boat & Motor Wks. 179
Delanco Shipbldg. Corp. 119-120-121-122
Densmore Co., J. M. 127
Devoe & Raynolds Co., Inc. 181
Disappearing Propeller Boat Co. 163
Dobson, B. T. 64
Doman, H. C. 153
Donnelly, William T. 138

E

Elco Co. .....2nd Cover
Elgin Nation Watch Co. 4
Elto Outboard Motor Co. 169
Evinrude Motor Co. 67

F

Fay & Bowen Engine Co. 194
Ferdinand & Co., L. W. 164-165
First National Co., The. 66
Fisher, Carl G. 65
Frishie Motor Co. 159-160-161-162
Fuel Oil Motors Corp. 118

G

Gardner & Co., Wm. 57
Gielow, Henry J. 54
Gill & Sons Forge & Mach. Wks., P. H. 183
Gordon Propeller & Mfg. Co. 182
Gray-Aldrich 181
Gray Boats, The 179
Gray Motor Corp. 189
Great Lakes Boat Building Corp. 12
Grebe & Co., Henry C. 58

H

Hacker Boat Co., John L. 175
Haddock, R. M. 57-64
Hall-Scott Motor Car Co. 82-83
Hamilton Marine Eng. Exchange, Inc. 62
Hand, Jr., Wm. H. 64
Harrison Boat Works, R. W. 179
Harvey Marine Motor Co. 166
Hebgen, A. G. 182
Hess Motor Co. 134
Hyde Windlass Co. 181

J

J. V. B. Engine Co. 107
Janney, Steinmetz & Co. 174
Jennings Co., H. H. 56
Jones, Frank Bowne 56
Johnson Motor Co. 6

K

Kermath Mfg. Co. 139-140-141-142
Kirby, George, Jr., Paint Co. 129
Knox Motors Associates. 167
Koven & Bro., L. O. 181

L

Leemon Boat Co. 131
Lockwood-Ash Motor Co. 156-188
Lord, Frederick K. 64
Luders Marine Construction Co. 182
Lunkenheimer Co., The 126

M

McFarland Foundry & Machine Co. .. 170
McKinnon Iron Works Co. 96
McLouth, Sidney C. 185
Marine Wheel Co. 2
Masten Co., Inc., G. H. 182
Masters & Co., W. L. 63
Mathis Yacht Building Co. 174
Michigan Marine Motor Corp. 137
Mower, Chas. D. 64
Mullins Body Corp. 186

N

National Carbon Co. 11
Nat'l Assn. of Engine & Boat Mfg. ... 170
National Automotive Mfg. Co. 185
Naval Architects & Yacht Brokers. ... 64
New London Ship & Engine Co. 171
New York Yacht, Launch & Engine Co. 183
Niagara Motors Corp. 146
Nock, Frederick S. 64-135

O

Oberdorfer Brass Co., M. L. 179

P

Palmer Bros., Engine, Inc. 94-95
Paragon Gear Works. 3-85-147-191
Pierce, J. H. 132
Piston Ring Co., The. 109
Peerless Marine Motor Co. 155
Prentiss-Wabers Stove Co. 90-91
Purdy Boat Co. 81

R

Racine Boat Co 181
Rajah Auto Supply Co. 93
Red Wing Motor Co. 148
Regal Gasoline Engine Co. 183
Richardson Boat Co. 145
Ritchie & Sons Co. 158

S

Sanford, H. W. 58
Scripps Motor Co. 173
Schellenberg, B., & Sons. 92
Sea Sled Co. 69-70-71-72
Seth Thomas Clock Co. 154
Simms Magneto Co. 158
Skaneateles Boat & Canoe Co. 136
Snow & Petrelli Mfg. Co. 177
Southern Cypress Mfrs. Assn. 111
Southland Steamship Co. (Lebby Products Division) 182
Sponagle, C. S. 64
Spinaway Boat Motor Co. 115
Standard Gear Co. 77-78-79-80
Standard Motor Construction Co., 2d Cover-97-98
Stearns-McKay Mfg. Co. 68
Stearns, Frank B. 62
Stearns Motor Mfg. Co. 99-100-101-102
Sterling Engine Co. 3rd Cover-123
St. Lawrence Boat Works. 128
Syracuse Gear Co. 184

T

Tams & King. 55
Thompson Bros. Boat Mfg. Co. 181
Tiebout, W. & J. 133
Tvedt-Smith Co. 106

U

Ultra Six Marine Motor Co. 88
Universal Motor Co. 112-113
Universal Products Co. 153

V

Valentine & Co. 51
Vibration Specialty Co. 143

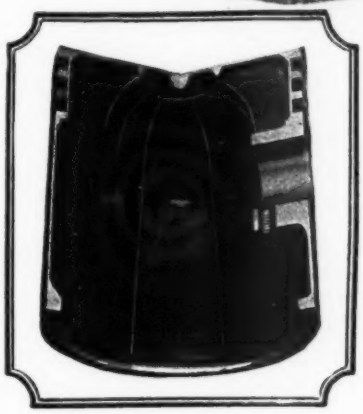
W

Wilcox, Crittenden & Co. 104-105-152
Willis Co., E. J. 149
Winton Engine Co. 151
Winslow, Ralph E. 64
Wisconsin Motor Mfg. Co. 7-8-9-10
Woolsey Paint & Color Works, C. A. ... 182

Z

Zundel Co., Inc., R. W. 183

"It Can't Be Done," - and yet WE DO IT



More Truth Than Poetry

The oil and gas
You've bought and lost
Would more than pay
The DELUXE cost.

All good things are imitated, but look inside for the name "DELUXE." It is there for your protection.

DELUXE pistons and coreboxes for making the same are thoroughly protected by U. S. and foreign patents. We intend to vigorously defend our rights and prosecute all infringers.

DELUXE
LIGHT WEIGHT CAST IRON PISTON
"The Successful Light Weight Piston" ©

Science again achieves the "Impossible"

When they first saw a DELUXE piston with its scientific reinforcing ribs, most engineers admitted its manifest superiority over all other pistons, but they said "Commercially, it can't be done."

And yet,—we do it. Because of scientific foundry and machine shop practice, nearly one million DELUXE pistons, sold not only at a reasonable, but at a low price, have made good under the most strenuous conditions.

The scientific reinforcing ribs make DELUXE pistons stronger where strength is needed and 40 to 50% lighter than stock factory cast pistons.

DELUXE pistons have less expansion, greater cooling surface and can be fitted closer than other pistons.

They eliminate oil pumping, piston slap and vibration. They save gas, oil, repairs and depreciation. They make old motors like new, and new ones better.

DELUXE pistons increase power, speed and flexibility.

We are telling motorists the truth when we say that *every* motor, old or new, needs DELUXE pistons. Why not cash in on the record DELUXE pistons have made and will make?

DELUXE pistons are made for over 1,400 different types of internal combustion engines and in all sizes and over-sizes, so you can handle any job that comes in,—at a good profit. And you can get DELUXE pistons on 24-hour notice or less.

Ask us for details or write our nearest distributor, listed in Chilton's Automobile Trade Directory, The (Red) Automobile Trade Directory or Might's Canadian Automotive Directory.

Patented and Manufactured by

Clark-Turner Piston Company

INCORPORATED

Los Angeles, California

COME and SEE

25-Foot Fay & Bowen Sport Model

We will exhibit at the

NATIONAL MOTOR BOAT SHOW

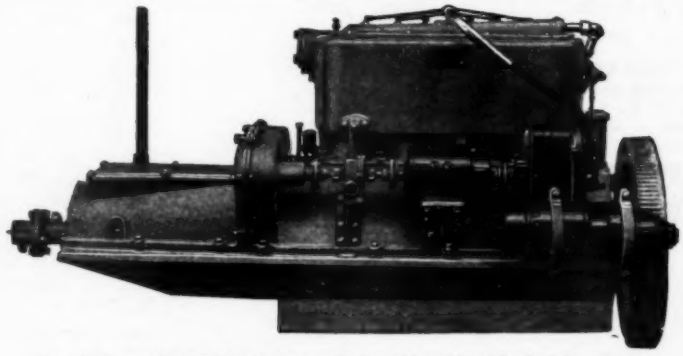
at Grand Central Palace, New York City, Feb. 17th to 25th, the following boats and engines:

Boats

Name of Boat	Length	Beam	Draft	Power Model	Power H. P.	Speed M.P.H.	Type of Boat
Junior Runabout	24' 0"	5' 0"	20"	LN-41	22	16	Round bilge
Sport Model	25' 0"	5' 4"	25"	LNS-43	50	23	V-bottom
27' Runabout	27' 0"	5' 3"	22"	LN-42	40	19	Round bilge

Engines

Model Number	Bore	Stroke	H. P.	No. of Cylinders
LN-41	3½"	4½"	22	4
LN-42	4¼"	5½"	40	4
LN-43	4¾"	5½"	40	4
L-44	5"	6¼"	45	4
L-63	4½"	5½"	50	6
L-64	5"	6½"	85	6



Fay & Bowen Model LN-42 four cylinder 4¼ x 5½ with electric starter

RELIABILITY F&B

FAY & BOWEN ENGINE COMPANY

104 LAKE STREET, GENEVA, N. Y., U. S. A.

NEW YORK: 44 Third Ave. at 10th St., Sutter Bros., Representatives
PHILADELPHIA: 116 Walnut St., Marine Equipment & Supply Co., Representatives
BOSTON: 84 Atlantic Ave., Gray-Aldrich Co., Representatives

Advertising Index will be found on page 192

922

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2

25%

Average Reduction of Prices on Buffalo Marine Engines

THE Buffalo Gasolene Motor Co. announces a material reduction in the prices of Buffalo marine engines. Because of manufacturing problems the reduction is not relatively the same on all models, but it will be found to average more than 25 per cent.

Below are shown the new prices compared with the prices of the last two years. In each case the price includes full regular equipment, including reverse gear, f. o. b. Buffalo.

	1920 Prices	1921 Prices	Present Prices
16-20 H.P. Cruiser and Runabout	$1,025.00	$ 923.00	$ 850.00
25-30 H.P. " " "	1,400.00	1,260.00	1,000.00
40-60 H.P. " " "	2,625.00	2,363.00	1,600.00
50-80 H.P. " " "	3,700.00	3,330.00	2,450.00
10-12 H.P. Heavy Duty	900.00	890.00	925.00
13-15 H.P. " "	1,200.00	1,185.00	1,150.00
20-22 H.P. " "	1,625.00	1,600.00	1,450.00
20-24 H.P. " "	1,850.00	1,800.00	1,400.00
26-30 H.P. " "	2,650.00	2,385.00	1,675.00
40-45 H.P. " "	3,750.00	3,375.00	2,500.00
45-50 H.P. " "		3,550.00	2,750.00
60-70 H.P. " "	4,950.00	4,455.00	3,350.00
70-80 H.P. " "		4,680.00	3,700.00
85-100 H.P. " "	7,400.00	6,600.00	5,900.00
125-150 H.P. " "	11,400.00	10,260.00	8,850.00

The Buffalo Book which tells the story of Buffalo engines in detail will be sent to you for the asking.

BUFFALO GASOLENE MOTOR CO.

1274-86 Niagara Street **Buffalo, N. Y.**

Save Room, Save Money, With A
"MICHIGAN" REVERSIBLE PROPELLER

Save the room a reverse gear would take up in your boat, save some of the money a reverse gear would cost, by installing a "Michigan" Reversible Propeller. In many ways this reversible propeller is superior to a reverse gear.

The propeller can be set at any pitch and speed, from stationary to full speed forward or reverse. It is light, compact and simple. It is carefully made and carefully balanced. Strong and sturdy with no small parts to give trouble and wear out, no gears in operation to heat up or grow noisy.

The "Michigan" Reversible gives you perfect control of your boat. You can run as slow as you wish without killing the engine. If you want speed, we can furnish this propeller with racing blades. If your boat is an auxiliary you can set the blades in neutral position so as to sail along with engine stopped without any drag from the propeller.

If you have not considered a reversible propeller for your boat, perhaps you've missed the best solution of your reverse problem.

Look for this trademark. See that it is stamped upon the hub of your propeller wheel. It is our guarantee of quality

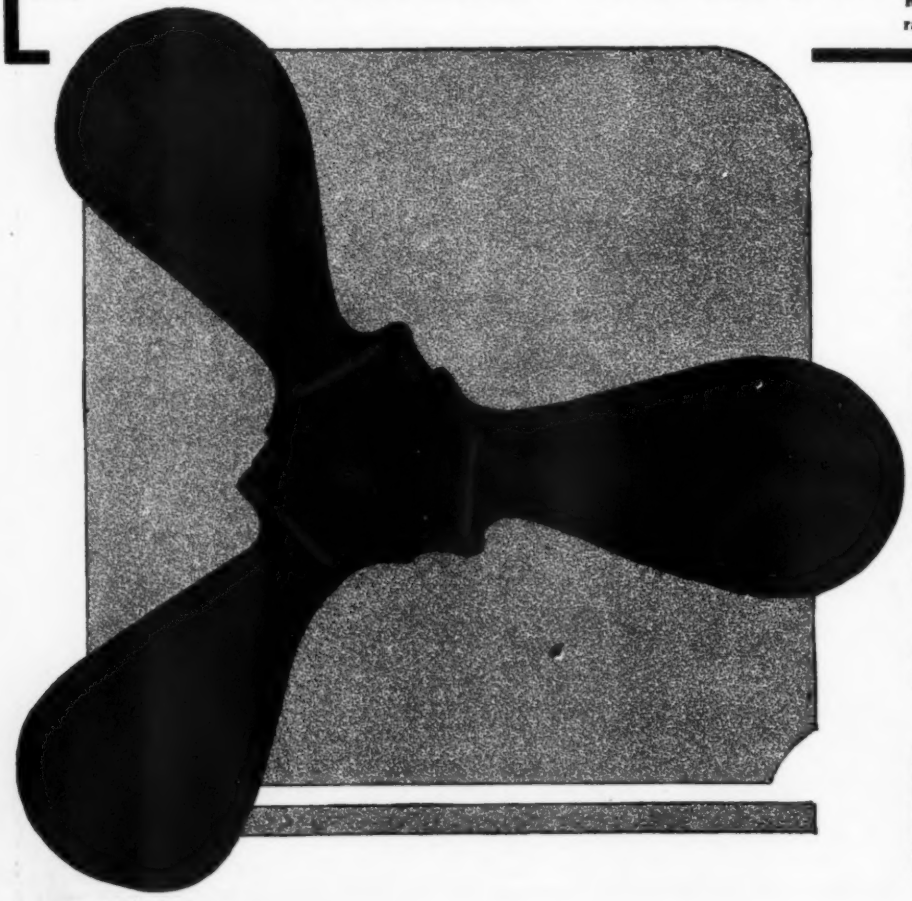
and service and protects you from inferior products that attempt to imitate the performance of the FAMOUS "MICHIGAN" PROPELLERS.

Write today for Catalog and Prices giving details of your boat and engine.

MARINE WHEEL COMPANY

45 Market Avenue Grand Rapids, Mich.

We also furnish the MICHIGAN REVERSIBLE PROPELLER with racing blades for fast boats.



MICHIGAN DISTRIBUTORS

Baltimore, Md.	James Walker Co.
Boston, Mass.	A. S. Morss Co.
Chicago, Ill.	Geo. B. Carpenter & Co.
Cleveland, Ohio	Fire Equipment & Marine Supply Co.
Cleveland, Ohio	Upson - Walton Co.
Duluth, Minn.	Kelley - Duluth Co.
Little Rock, Ark.	Central Supply Co.
Marked Tree, Ark.	J. Krier & Co.
Memphis, Tenn.	Reichman-Crosby Co.
Milwaukee, Wis.	Joys Brothers
New Orleans, La.	Alker - Donovan Co.
New York City	W. & J. Tiebout
Rosedale, Miss.	Rosedale Machine & Supply Co.
Salem, Mass.	W. J. Harris
Sault Ste. Marie, Mich.	Soo Hardware Co.
Seattle, Wash. (Reversible)	Pacific Net & Twine Co.
Tampa, Fla.	J. M. Keely Supply Co.
Toledo, Ohio	Toledo Sales & Engine Co.
Washington, D. C.	Barber & Ross

OTHER MICHIGAN PRODUCTS

Propellers
Solid and Reversible
Towing, Speed and
Weedless Types
Rear Starters
Exhaust Silencers
Bilge Pumps
Universal Joints
Flange Couplings
Stern Bearings
Marine Hardware

THE connecting link between your power plant and your propeller—The Reverse Gear—is a vitally important adjunct. If it fails you are completely out of luck, unable to move your boat, at the mercy of wind and tide.

¶ So dependability in a Reverse Gear is a prime necessity. First cost must be subordinated to quality. Safety is of paramount importance in the operation of a boat.

¶ YOUR boat must be equipt with a dependable gear to be safe.

(*Continued on page 85*)

1922

A Strictly Designed Marine Motor
10 to 25 H. P.

Gray

VALVE-IN-HEAD MOTOR

The Motor News of 1922 —

Better in every detail—Better as a whole—

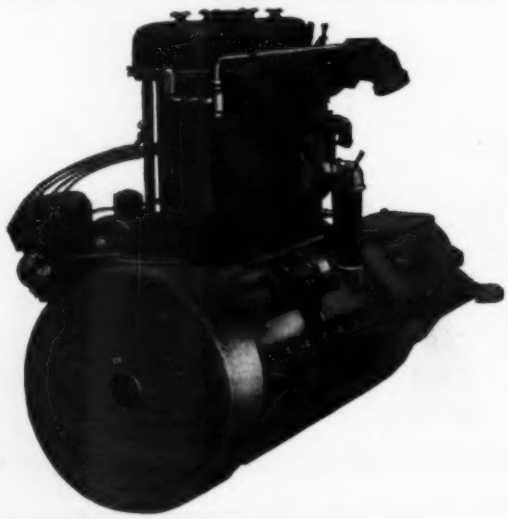
THE 1922 Gray is neat in appearance, compact, and can easily and inexpensively be installed in runabouts 20 to 30 ft. in length; small cruisers up to 34 ft., also work boats. Note the rigid one-piece base with reverse Gear enclosed.

The Gear is automatically lubricated with positive gear pump that lubricates all other internal working parts of the engine—no grease cups or thick transmission oil used.

Oil filler is conveniently located on top of engine with duct leading to Crank Case. Rocker arm shaft is hollow and automatically supplies oil to Rocker Arms. Oil is forced under pressure to the three main bearings, and to the connecting rod troughs.

In brief, the Gray Oiling System leaves nothing to chance. It is unfailing at all engine speeds, and all oil is kept inside the engine, and not thrown around the boat or on its occupants.

The fly wheel is enclosed, affording *safety* and *cleanliness*. Bilge water cannot be thrown by the fly wheel. Every working part is enclosed; even the push rods. Due to the special design of the Cam Shaft, push rods and rocker arms, scarcely a sound can be heard with the ear close to the engine.



Its smooth, quiet operation at all speeds from 200 to 2000 would compare favorably to an electric motor.

This Gray Improved Valve-in-Head operates most economically on the low grade gasoline and satisfactorily on kerosene.

The diameter of the main bearings are:

Front 2⅛". Center 2 1/16". Rear 2". The lengths are 3⅜", 2½", 2½" respectively.

Crank Shaft is 40-50 point carbon steel forging, heat treated and ground.

Special attention is given to the balancing.

The shaft is put in rotative as well as static balance on an Akimoff Dynamic Balance Machine, reducing vibration to a minimum.

Bosch Magneto with Impulse Starter, also Bosch two unit Starter and Generator is used.

Gray Two-Cycle Motors are built in models from 3 to 8 h.p.

Write for FREE literature

Gray Motor Corporation

2106 Mack Ave. **DETROIT, MICH.**

Advertising Index will be found on page 192

Carry Boat Power with You

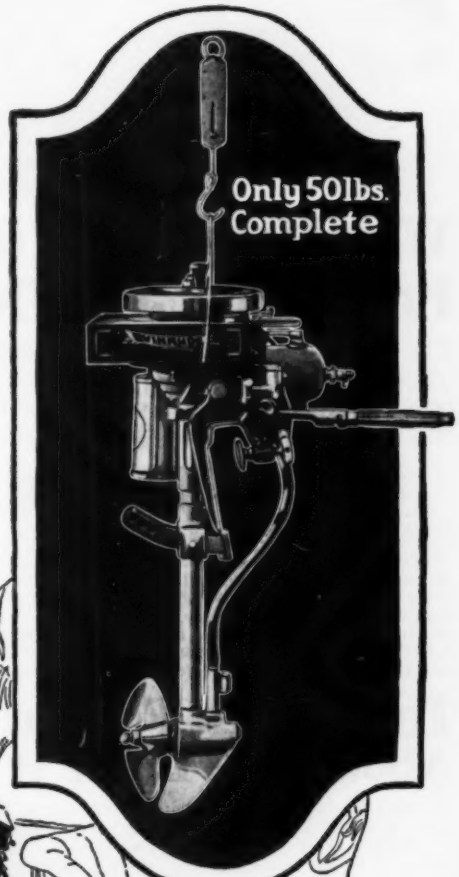
YOU motoring sportsmen, you whose fishing, camping or hunting trips turn week-ends and holidays into delightful vacations—the new Evinrude "Lightweight" is your wish come true. An Evinrude—the same sturdy, dependable "stern kicker"—*twenty-one pounds* lighter, so you can carry it handily in car, train or trolley.

Light, strong aluminum alloys, replacing many bronze and malleable parts, have brought the total weight just under 50 pounds *complete*. No heavier than a good string of fish.

You can't find a handier power plant for dinghy or tender than this new Evinrude sport model. Easier to lift—more quickly attached or detached. Clamp it to any small craft and you save time and oar-work, carrying guests or supplies between shore and anchorage.

The "Lightweight" has the same wonderful power and speed as the standard 2 H. P. model, famous throughout the world. While not designed for such rugged service, it is a true Evinrude, husky and durable.

See the Evinrude motors at your sporting goods or hardware dealers. Or write for catalog and new prices (recently cut to pre-war level).



Evinrude Motor Company
619 Evinrude Bldg.
Milwaukee, Wis.

DISTRIBUTORS:

69 Cortlandt Street.....New York, N. Y.
780 Commonwealth Avenue....Boston, Mass.
440 Market Street.....San Francisco, Cal.
211 Morrison Street.....Portland, Ore.

See the Evinrude Exhibit at National Motor Boat Show, Grand Central Palace, New York City, February 17th to 25th.

EVINRUDE "LIGHT-WEIGHT"
DETACHABLE MOTOR FOR WATERCRAFT

The Lightest Outboard Motor in the World

2 Cylinders —2 H. P.

Why Motor Boat Owners Prefer the JOHNSON

The Johnson Lightweight 2 Cylinder 2 H. P. Motor has an irresistible appeal for all lovers of water sports. So much speed and power has never before been put up in such a small package. Think of it! Weighs—

Only 35 Pounds Complete

Easy to carry anywhere. Yet drop the "Johnson Twin" over the stern of any row boat or canoe and quietly, easily, speedily you plow through the water. There is not one needless pound to drag. Johnson has increased power and greatly lessened weight solely through better designing, finer workmanship and more modern materials. Johnson Engineers built the first V type multiple cylinder marine and aeronautical motor—the first American monoplane and the first motor successful in driving a bicycle as an attachment. Now they have made the outboard motor almost as convenient to carry as a pair of oars and as dependable and durable as the finest designed power boat engine.

Ten Other Features You'll Like About the Light Weight Johnson

We equip the "Johnson Twin" with a real "Quick Action" Magneto and a real Carburetor. There are no batteries to renew or to carry. There is no bothersome mixing valve. Just an easy pull on a simple cord starter spins the motor at top speed. The hot spark from the Quick Action Magneto, the convenient choke and the perfect mixture delivered by the float feed carburetor insure a quick, easy start. Spark and throttle control like auto gives you any speed you want. Automatic self-tilting feature and protecting skeg carries you safely over logs, sandbars or other hidden obstacles. Quick reverse feature enables you to stop boat at full speed in half its own length. The twin cylinders firing simultaneously greatly reduce vibration. Have same number of power explosions per revolution as a 4-cylinder automobile engine, making the Johnson the smoothest, quietest motor on the water. The Johnson is clean to handle and operate. There are no dripping grease cups or oil cups. Motor can be taken apart easily at one joint for carrying in case. Beautifully finished in polished aluminum and nickel. Free Illustrated Catalog Folder just out fully describes this marvelous new lightweight motor. Write for it today. ***The Johnson Agency is a real proposition for live dealers.***

JOHNSON MOTOR CO. 860 Sample St., South Bend, Ind.

Every Johnson OutboardMotor is absolutely guaranteed to perform satisfactorily as claimed and to be free from all defects in material and workmanship

Johnson
OUTBOARD MOTOR

"Built on the Banks of the St. Joe"

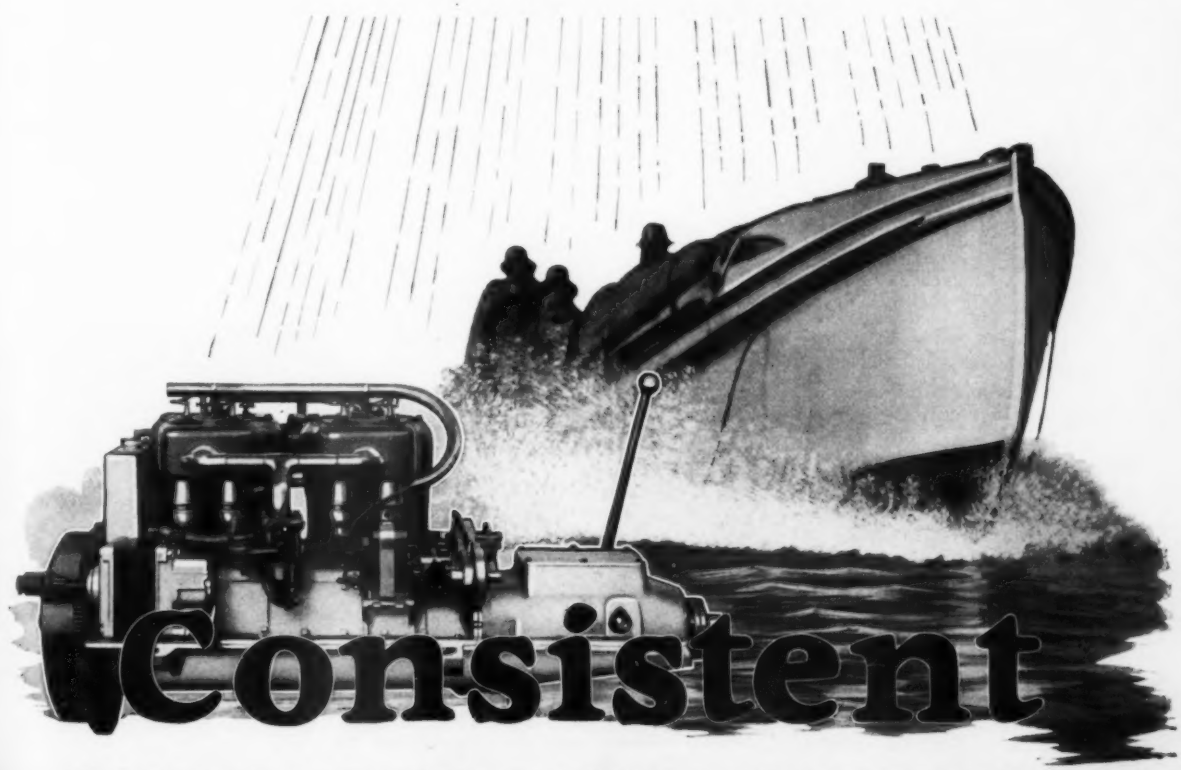
Advertising Index will be found on page 192

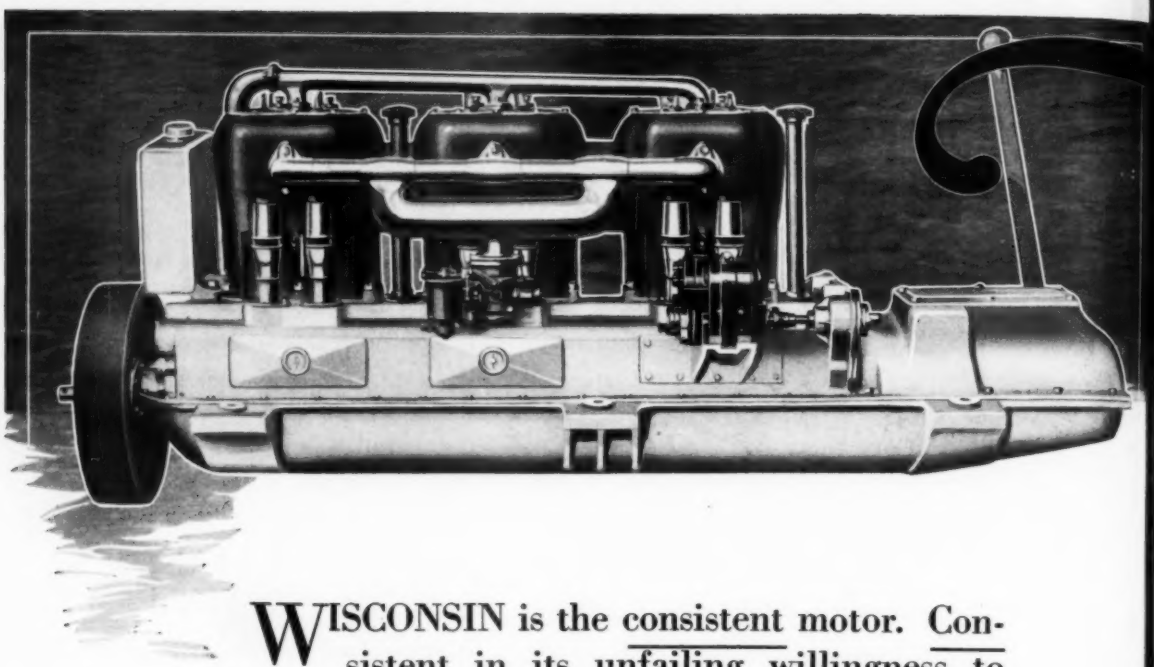
Wisconsin

Consistent

WITH your new boat—all the skill of the foremost designers, all the combined craftsmanship of famous builders—could not compensate for inferior performance in your motor. Each year, motor performance measures the worth of your boat, from the time it takes the water, straight through the succession of afternoon runs and week-end trips and longer cruises, until you haul out in the fall—

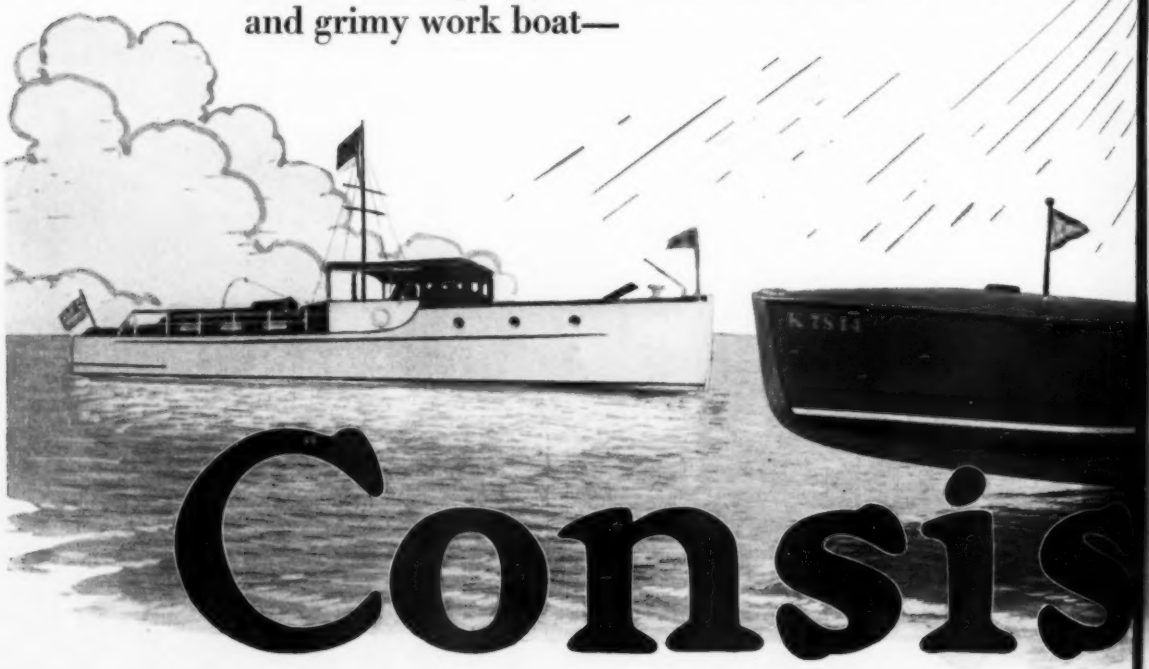
Visit the Wisconsin exhibit in space B-7, New York National Motor Boat Show, February 17th to 25th





WISCONSIN is the consistent motor. Consistent in its unfailing willingness to start running and keep running until stopped. Consistent whether its duty calls simply for trouble-free service, or for unfaltering performance under downright abusive conditions. Consistent throughout is the record of its many years of widespread use in every type of power craft, from speedy runabout to husky cruiser and grimy work boat—

Visit the Wisconsin exhibit in space B-7, New York National Motor Boat Show, February 17th to 25th



Consis

Advertising Index will be found on page 192

Wisconsin

Consistent

ONE word—"consistent"—is the true measure of satisfactory motor performance. It is the summed-up, one-word story of powerful, dependable service—year after year—in squall or calm or gale. Briefly it words all the praise you can give a motor, all the pride of ownership you can express. And wherever boats are moored and yachtsmen gather, "consistent" is inseparably associated with Wisconsin Motors!

Visit the Wisconsin exhibit in space B-7, New York National Motor Boat Show, February 17th to 25th

tent

Wisconsin

Consistent

IF you are building a new boat, or installing a new motor in your present boat, get full facts on the Wisconsin. Learn its record for *consistency*. Listen to the opinions of other yachtsmen, to the testimony of Wisconsin owners. Visit the Wisconsin exhibit at the show.

Wisconsin Motor Mfg. Co.

MILWAUKEE WISCONSIN

Visit the Wisconsin exhibit in space B-7, New York National Motor Boat Show, February 17th to 25th

Distributors:

New York Office: 21 Park Row, New York, N. Y.
Wisconsin Motor Parts Co., 2354 Cottage Grove Ave., Chicago
Earl P. Cooper Co., Los Angeles, California
Chandler Hudson Co., Seattle, Washington

Advertising Index will be found on page 192

HERE'S the Columbia "Hot Shot" Dry Battery, with 4 times the life of an ordinary battery and moisture proof.

A spark that snaps—zips up an engine—makes lazy gas work. Perfect ignition.

A Single Dry Battery of 4 Cellpower—Moisture Proof—Only 2 Binding Posts, and They're Perfectly Insulated

Not a thing to keep in running order—not a spot to protect from rust—not a connector to work loose and break the circuit.

Ask your dealer today for a Columbia "Hot Shot" for your ignition — and you'll order another soon for your lights.

NATIONAL CARBON COMPANY
Incorporated
Cleveland, Ohio San Francisco, Calif.
Canadian National Carbon Co., Limited, Toronto, Canada

Columbia Dry Batteries

— they last longer

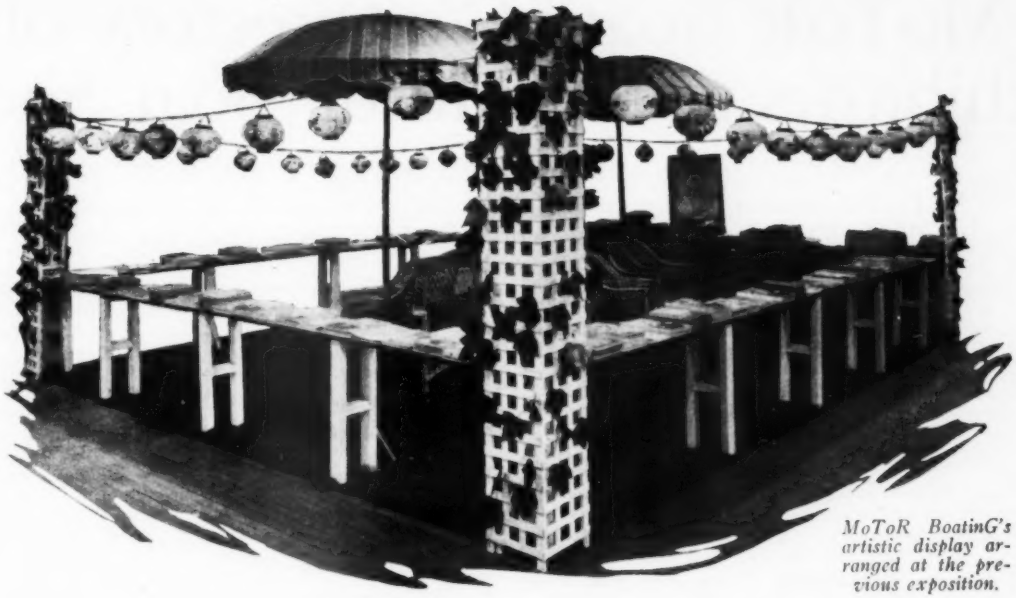
Speedway

On Exhibition at the
New York Motor Boat Show

CONSOLIDATED SHIPBUILDING CORPORATION

Morris Heights **New York City**

Advertising Index will be found on page 192



MoToR BoatinG's artistic display arranged at the previous exposition.

The Best and Largest Show Ever

Heralding the Approach of Spring, Yachtsmen From All Parts of the Country Gather to Inspect the Products Displayed and to Discuss Plans for the Coming Season

By Ira Hand

Secretary, National Association of Engine and Boat Manufacturers

THIS year's Show will be better and larger than ever. This may seem, to some, like a stereotyped phrase, but, unless it was a better Show than the last one held it would mean retrogression, and boat and engine builders are progressive. Despite the general depression of the past few years, the members of the National Association of Engine and Boat Manufacturers have responded splendidly to the call for the Show, and each one is so full of enthusiasm and optimism that the big exhibition must be a success.

The dominant note this year is an effort to bridge the gap between those who know boating and those millions who have never been made acquainted with its joys and possibilities. It is easy to attract the veterans, those who have learned to love the sport. They could not be kept away from the exhibition, but it is difficult to reach those who are outside the pale of that clan. If boating is to continue to be popular, if it is to grow in popularity, it must make converts. It must find its converts among those of the younger generation, and if the love of boating can be properly instilled into the boys or girls, they will never forget what boating will do for them and what pleasures and delight can be had with a boat, no matter how small.

A special program of days has been arranged for the week. Monday, February 20th, will be Waterway League Day, and special efforts will be made in the development of the plans of that worthy organization.

Tuesday will be Buffalo Day, devoted to all those who have worked so hard to make Buffalo a motor boat centre. The Society of Automotive Engineers will have a technical session, followed by a luncheon, on Tuesday, February 21st, at the Hotel Commodore.

Wednesday will be Canadian Day. Canadian sportsmen, in larger numbers than ever, who have entered so heartily into motor boat competitions in the past, are planning bigger things for the future.

Thursday will be National Association Day. The Annual Meeting and Luncheon of the Association will be held in the Engineers' Club and this meeting promises to be of more than ordinary interest, as many topics of importance will be discussed by the members. It will also be Great Lakes Day and visitors from Cleveland, Toledo, Detroit, Chicago and intermediate ports plan to attend.

Friday will be Yachtsmen's Day, and members of the American Power Boat Association, the U. S. Power Squadrons, the International Power Boat Union, the Mississippi Valley Power Boat Association and other organizations have planned to hold meetings.

Saturday will be Philadelphia Day, and the yachtsmen from the Quaker City, where there are so many keen sportsmen, will be largely in evidence.

The exhibition this year is a remarkable one. There are eight good cruisers on the main floor and they represent the very latest ideas of the designers and builders for the comfort of those who will use these craft. There are also more than fifty other boats, runabouts, small open boats, yacht tenders, sailing craft, row boats with outboard motors, and even an ice yacht—one of the new Hudson River type.

Foreign motors will make their first appearance since the war. The heavy oil engines of the Diesel type will also be of special interest. All of the leading builders of marine engines in this country will have their latest models on view at the coming exhibition, and the new designs and innovations will be of a nature to attract and hold the attention of the visiting motor boat enthusiasts. The very latest of accessories for both the boat and the engine will be shown in profusion. Devices to increase the efficiency of the motor, to lighten labor and minimize upkeep costs, will all be in evidence with a greater variety than ever of the usual array of these appurtenances to motor boating.

The Educational Department, maintained at the expense of the National Association of Engine & Boat Manufacturers will present to young and old all of the affiliated activities and opportunities that serve to stimulate the interest of yachtsmen. Among the organizations that will make their headquarters at the Show will be the American Power Boat Association, United States Power Squadrons, Waterway League of America, United States Coast & Geodetic Survey, the American Red Cross, Life Saving Corps, Trent Waterway Association and many others.

MoToR BoatinG's Directory of Exhibitors at the Motor Boat Show

A Valuable Guide and Directory to the Entire Show—The Space Occupied by Each Exhibitor is Mentioned as Well as the Names of the Individuals at the Exhibit With Their New York Hotel Addresses During the Show

Allison Engineering Company.....**Indianapolis, Ind.**
Block E N. H. Gilman, E. M. McNally, *Vanderbilt*

American Bosch Magneto Corporation....**Springfield, Mass.**
Space 101-103 C. F. Graesser, A. H. Bartsch
G. Shortmeier, L. B. Smith

American Power Boat Association.....**New York, N. Y.**
Mezzanine H. A. Jackson, C. H. Moore,
C. F. Chapman, M. Rosenfeld, Official Photographer

Atlantic Marine & Construction Co......**New York, N. Y.**
Block D-2 I. Mullins, L. McKnight, L. R. Bester

Atwater Kent Manufacturing Co......**Philadelphia, Pa.**
Space 28 H. R. Carlisle, H. T. Stockholm, *Commodore*

Belle Isle Boat & Engine Co......**Detroit, Michigan**
Block A-5 E. M. Gregory

The H. E. Boucher Mfg. Company.....**New York, N. Y.**
Space 100 H. E. Boucher, J. J. Wermer,
D. S. Simpson, F. J. Harjes

Bowler, Holmes & Hecker Company.....**New York, N. Y.**
Block K H. E. Holmes, A. L. Rankin

The Bridgeport Motor Company, Inc.....**Bridgeport, Conn.**
Block E H. E. Brautigan

Brooklyn Varnish Mfg. Company.....**Brooklyn, N. Y.**
Space 26 D. C. Anderson, W. S. Anderson

Burnot Fireproofing Products, Syndicate...**New York, N. Y.**
Space 57

Cape Cod Ship Building Corporation.....**Wareham, Mass.**
Block A-6 C. S. Gurney

The Carlyle Johnson Machine Company..**Manchester, Conn.**
Block K S. H. Simon, J. H. Roberts, J. S. Wolcott
A. R. Coe, *Bristol*

Geo. B. Carpenter & Company.....**Chicago, Ill.**
Space 37-39 Allan C. Forbes, J. W. Sackrider, *Commodore*

Columbian Bronze Corporation.....**New York, N. Y.**
Block L Louis J. Hall, Edwin F. Schumacher
Leon H. H. Roses, *Bristol*

Consolidated Shipbuilding Corporation, Morris Heights, N. Y.
Block B-1, A-2, A-3 J. J. Amory, C. G. Amory
B. Scrimgeour, W. G. Wood

Crescent Motor Boat Company.....**New York, N. Y.**
Block B-5 E. J. Wright, Geo. H. Montrose

Culver Engineering Corporation.....**New York, N. Y.**
Block C P. A. Talbot

Champion Transformer Co......**Portchester, N. Y.**
Space 70 J. F. Walker

Cronin Saunders Co.....**New York, N. Y.**
Space 8

Coast & Geodetic Survey.....**Washington, D. C.**
Mezzanine D. B. Wainwright

Cleveland Marine Motor Company.....**Cleveland, Ohio**
Block D H. C. Barnes, L. R. Carpenter, *Commodore*

Dawn Boat & Shipbuilding Corporation, Clason Point, N. Y.
Block B-4 N. E. Donnelly, D. M. Barnes, E. Hehre

Delanco Shipbuilding Co., Inc......**Delanco, N. J.**
Block B-4 H. F. Miller, W. C. Strugnell, *Commodore*

Disappearing Propeller Boat Corp. of N. Y.,
North Tonawanda, N. Y.
Block D-1 F. A. Babcock, F. E. Hewitt, H. W. Knight
F. A. Marburg, W. J. Norwich, N. H. Wilson, *Commodore*

The Debevoise Company.....**Brooklyn, N. Y.**
Space 29 Capt. Frank Day, Ralph W. Chrystie, John J.
Reilly, Frank W. Tibben, F. Winans, Thomas C. Wiswall

Domestic Electric Co., Inc......**New York, N. Y.**
Space 14-15

Dauntless Shipyard Inc......**Essex, Conn.**
Block O W. B. Brash, *Richmond*

William T. Donnelly.....**New York, N. Y.**
Block B-4 N. E. Donnelly, D. M. Barnes

Chas. D. Durkee & Company, Inc......**New York, N. Y.**
Space 1-5 Henry Blossy, F. H. Fricke, Jos. Tagleibue

Dow Chemical Co.....**Midland, Mich.**
Space 34

Elto Outboard Motor Company.....**Milwaukee, Wisc.**
Block D-2 O. Evinrude, H. E. Moering, H. Stern
Commodore

Hubbard.H. Erickson & Company.....**Chicago, Ill.**
Space 44 G. W. Campbell

The Elco Works.....**Bayonne, New Jersey**
Block B-2, B-3, B-4 Ralph H. Kingsley, *Commodore*
Irwin Chase, Thomas S. Hanson

Evinrude Motor Company.....**Milwaukee, Wisc.**
Block A-5 H. Biersach, O. A. Dole
C. J. Meyer, *Commodore*, Oluf Mikkelsen

The Excellight Company.....**Forestville, Conn.**
Space 84 H. W. Armstrong, C. I. Johnston

Economy Products Corp.....**New York, N. Y.**
Space 60 W. Jorgensen, W. Kopke, S. Faucett

Fay & Bowen Engine Company.....**Geneva, New York**
Block A-1 Russell Allan, W. P. Harris, P. C. Staley
J. M. Ward, *Commodore*, John A. Sutter, Alphonze Sutter

Fire Gun Mfg. Company.....**New York, N. Y.**
Space 82 E. L. Dalrymple, R. W. Johnson, C. M. Hodgkinson, H. L. Heulings, H. E. Tunnell, J. B. Westervelt

The Francke Company.....**Newark, N. J.**
Space 50 H. F. Field, W. J. Francke, R. A. Smith

The Frisbie Motor Company.....**Middletown, Conn.**
Block E M. S. Cornell, Jr., K. W. Dyer, William
Warmester, J. McLeod, Percy Semmelhaack, *Commodore*

Fuel Oil Motors Corporation.....**New York, N. Y.**
Block C Otto Kraus, C. A. Kurzel, J. J. Dobson

Generator Valve Company.....**Brooklyn, N. Y.**
Space 63 J. James

Gilbert Boats, Inc......**New York, N. Y.**
Block D-2 G. Gilbert

Gray Boats.....**Friendship, Maine**
Space 51 Russell Davis Gray
Howard Kramer Gray, *Commodore*

Gray Motor Corporation.....**Detroit, Michigan**
Block G-1 W. C. Disbrow, H. N. Link

Greenport Basin & Construction Company,
Greenport, L. I., N. Y.
Block A-7 James W. Hussey, Theodore Wm. Brigham

Hall-Scott Motor Car Co., Inc......**Berkeley, Cal.**
Block N A. J. Utz, *Commodore*

Haskell Boat Company.....**Ludington, Mich.**
Block J H. L. Haskell

Hyde Windlass Company.....**Bath, Maine**
Block G-2 F. C. Andrews, W. C. Disbrow

The J.V.B. Engine Company.....**Akron, Ohio**
Block F-2 Joseph Van Blerck, *Pennsylvania*
Frank B. Sexton

Johnson Motor Company.....**South Bend, Ind.**
Block C Chas. Kratsch, Albert Erickson, *St. James*

J. E. Battery Company.....**New York, N. Y.**
Space 112 N. W. Walker

Kermath Mfg. Company.....**Detroit, Mich.**
Block E J. B. Farr, F. C. Morgan, *Commodore*

Knox Motors Associates.....**Springfield, Mass.**
Block F-1 E. J. Stone, J. A. Manning
E. R. Gurney, *Commodore*

L. O. Koven & Brother.....**Jersey City, N. J.**
Space 43-45 L. O. Koven, G. H. Koven

Leece Neville Co......**Cleveland, Ohio**
Space 24 A. A. Skinner

J. W. Lathrop Company.....**Mystic, Conn.**
Block C Walter Lathrop

Geo. Lawley & Son Corporation.....**Boston, Mass.**
Block B-1 Frederick D. Lawley, *Commodore;* George F. Lawley, *Astor;* Albert E. Eldredge, *New York Yacht Club*

The McNab Company.....**Bridgeport, Conn.**
Space 71 A. McNab

The G. H. Masten Company, Inc......**New York, N. Y.**
Block J A. S. Hyde, *McAlpin*

Mercantile Specialties Corp......**New York, N. Y.**
Space 32-33 H. G. Mullen, *Algonquin;* Thro. D. Wells

Magno Storage Battery Corp.....**New York, N. Y.**
Space 102

Monarch Valve & Carburetor Company.....**Brooklyn, N. Y.**
Space 25 V. A. Murray

The Moto-Meter Company, Inc......**Long Island City, N. Y.**
Space 77 Wm. Russell Sloane, Robert Wilson, Frederick Gettler, Joseph Gettler, Enrique Steinacher

MoToR BoatinG.....**New York, N. Y.**
Space 51-55-56 C. F. Chapman, W. F. Bailey, A. E. Snyder, F. W. Horenburger, W. M. Eldridge, R. E. Berlin

Murray & Tregurtha Corporation.....**Atlantic, Mass.**
Block M J. A. Murray, W. A. Noyes

Miles Piston Ring Sales Co......**New York, N. Y.**
Space 42 A. E. Gallina

National Life Preserver Company.....**New York, N. Y.**
Space 73 A. E. Puckrin, F. B. Orvis, Oscar F. Kaiet J. E. Jackson, O. A. Youngren

National Marine Lamp Co.....**Forestville, Conn.**
Space 84 H. W. Armstrong, C. I. Johnston

New England Boat Works.....**Mianus, Conn.**
Block B-6 C. Bradley

New Jersey Motor Sales Company.....**Keyport, N. J.**
Block J C. A. Carlson

New Jersey Paint Works.....**Jersey City, N. J.**
Space 36 J. L. Pettit

North Light Motor Co.....**Toronto, Ont.**
Block O C. O. Peters

New Process Chemical Company.....**New York, N. Y.**
Space 69 A. Schlueter, W. Gutterson, L. E. Strawser

The New York Yacht, Launch & Engine Company, Morris Heights, N. Y.
Block F-1, F-2 J. A. Nickelson, J. F. Masterson

Old World Arts, Inc......**New York, N. Y.**
Space 78 A. A. Moers

Palmer Bros. Engines, Inc......**Cos Cob, Conn.**
Block C E. E. Palmer, G. E. Gieser, C. A. Hatheway

Paragon Gear Works.....**Taunton, Mass.**
Space 20-21 R. Wastcoat, R. Thompson

Peerless Marine Motor Company.....**Buffalo, N. Y.**
Block G-2 E. L. Grimm, *Commodore*

Joseph V. Petrelli Mfg. Co., Inc......**Port Chester, N. Y.**
Space 62 J. V. Petrelli

J. H. Perrine.....**Barnegat, N. J.**
Block A-7 J. H. Perrine

Pyrene Mfg. Company.....**New York, N. Y.**
Space 81 J. P. Maloney

Rajah Auto Supply Co......**Bloomfield, N. J.**
Space 12 W. P. Washburn, R. A. Bell

Red Bank Yacht Works.....**Red Bank, N. J.**
Block B-5 P. A. Proal

Red Wing Motor Company.....**Red Wing, Minn.**
Block C J. R. Trautner, *Commodore*

Regal Gasoline Engine Co.....**Coldwater, Mich.**
Block C A. E. Robertson, P. H. Robinson, *McAlpin*

William Richards.....**New York, N. Y.**
Space 72 Wm. Richards, J. K. Wilzin, H. B. Robertson

Robertson Certified Lubricants, Inc......**New York, N. Y.**
Space 68 Malcolm H. Robertson, Frank H. Donahue

Morton W. Smith, Inc......**New York, N. Y.**
Block H U. V. D'Annunzio, Chas. E. Proctor Morton W. Smith, Wm. F. Mohr

St. Lawrence Boat Works, Inc......**Ogdensburg, N. Y.**
Block D-2 Edward J. Madill, *Yale Club;* George B. Post

B. Schellenberg & Sons.....**Brooklyn, N. Y.**
Space 41 M. Schellenberg, Ralph Schellenberg N. Schellenberg

Scripps Motor Company.....**Detroit, Mich.**
Block G-1 H. P. Hellmuth, W. C. Disbrow, Jr.

The Sea Sled Company.....**West Mystic, Conn.**
Block G-1 H. P. Hellmuth, W. C. Disbrow, Jr. Frank Knoblock, F. H. MacNeil, *Commodore*

The Simms Magneto Company.....**E. Orange, N. J.**
Space 61 Alfred J. Poole, Victor W. Kliesrath Leon F. Acker

The C. C. Smith Boat & Engine Co......**Algonac, Mich.**
Block J C. C. Smith, J. W. Smith J. Lee Barrett, *Commodore*

Edward Smith & Co......**Long Island City, N. Y.**
Space 22-23 J. F. McBride

Smith-Meeker Engineering Co......**New York, N. Y.**
Space 17-30 C. G. Meeker, F. D. Smith, C. E. De Groot O. C. Olsen, G. W. Cook, B. L. Keyes

Smith & Serrell.....**Newark, N. J.**
Space 50 R. A. Smith, H. F. Field, W. J. Francke

The Snow & Petrelli Mfg. Co......**New Haven, Conn.**
Space 67 Arthur T. Nabstedt, Douglas M. Pierpont

Sperry Gyroscope Company.....**Brooklyn, N. Y.**
Block L R. B. Lea

Sterling Engine Company.....**Buffalo, N. Y.**
Block E C. A. Criqui, M. E. Mutchler, Chas. A. Criqui, Jr., *Commodore;* W. Bruns, M. C. Kimball, J. L. Killian

Sterno Corporation.....**New York, N. Y.**
Space 58 G. H. Durst, W. H. Meyer

Stromberg Motor Devices Co......**Chicago, Ill.**
Space 75 W. L. O'Neill

Standard Gear Company.....**Detroit, Mich.**
Space 105 D. A. Mead, W. R. Mead, *Commodore*

W. & J. Tiebout.....**New York, N. Y.**
Space 18-19 John Tiebout, John Tiebout, Jr., Charles E. Taylor, George V. Carlin, Frank J. Morrissey, John D. Gillespie, Charles H. Schult, E. E. Dent, Harry Sehres

Topping Brothers.....**New York, N. Y.**
Space 46-48 J. N. Topping, W. C. Douglas

Two-Way Pump Company.....**Baltimore, Md.**
Space 11

Universal Products Company.....**Oshkosh, Wis.**
Block M R. K. Schriber, *Commodore*

Vibration Specialty Company.....**Philadelphia, Pa.**
Space 80 G. W. Clinger, F. G. Hechler

Valentine & Company.....**New York, N. Y.**
Space 47-49 A. C. Kleberg, D. Walker

Van Keer Co. of N. Y., Inc......**New York, N. Y.**
Space 33

Verrier, Eddy Co......**New York, N. Y.**
Block C John Verrier, Leroy Eddy, Walter Lathrop

United States Power Squadrons, Inc......**New York, N. Y.**
Mezzanine H. A. Jackson, A. B. Duryee, H. M. Williams

Waterway League of America.....**New York, N. Y.**
Mezzanine W. S. Rauch, E. C. Schiffmacher

The Wheeler-Schebler Carbureter Co......**Indianapolis, Ind.**
Space 56 G. T. Brigg

Winton Engine Works.....**Cleveland, Ohio**
Block N A. G. Griese, G. W. Codrington, *Commodore*

Westinghouse Lamp Company.....**New York, N. Y.**
Space 79 R. B. Ely, F. W. Prince

Wilcox, Crittenden & Company.....**Middletown, Conn.**
Space 108 C. F. Herrmann, J. C. De Wolf, *Woodstock*

E. J. Willis Company.....**New York, N. Y.**
Space 83-85, 87-89 W. E. Willis

Wisconsin Motor Mfg. Co......**Milwaukee, Wisc.**
Block B-7 H. W. Schnetzky, A. F. Milbrath H. R. Mickelson, *Astor;* T. M. Fenner

Wolverine Motor Works.....**Bridgeport, Conn.**
Block K G. E. Clark, P. H. Korn, L. I. Snyder, R. L Booth, G. R. Colwell, Chas. Ryder, *Woodstock*

C. A. Woolsey Paint & Color Co......**Jersey City, N. J.**
Space 16 Percy Varley, F. C. Meyer, A. F. Hahn Arthur Scott, L. C. Ferguson

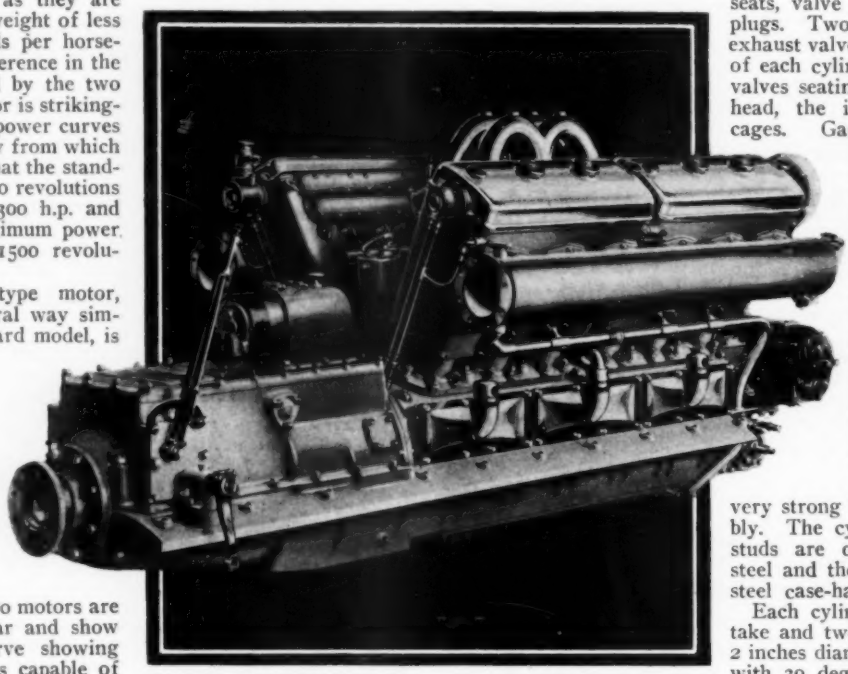
R. W. Zundel Company, Inc.....**New York, N. Y.**
Space 74-76 F. R. Zundel, *Commodore;* R. W. Zundel D. A. Booth, A. A. Lang, J. A. Gardiner, G. B. Yard

The Most Powerful Marine Motor

A Marine Motor of the Twelve-Cylinder V-Type Capable of Developing High Powers For Both Fast Cruisers and Large Runabouts

A MARINE motor capable of developing continuously power as high as 500 h.p., is that being built by the Allison Engineering Company, Indianapolis, Ind. These remarkably high power ratings of the racing model are exceptional as they are developed on a weight of less than nine pounds per horsepower. The difference in the power developed by the two types of the motor is strikingly shown by the power curves reproduced below from which it will be noted that the standard motor at 1000 revolutions develops about 300 h.p. and develops its maximum power of 425 h.p. at 1500 revolutions.

The racing type motor, while in a general way similar to the standard model, is designed to turn faster and produce more power. At 1300 revolutions it produces 400 h.p. and at its maximum rate of 1700 revolutions it goes as high as 500 h.p. The torque curves for the two motors are in general similar and show a flat even curve showing that the motor is capable of exerting a uniform effort on the propeller shaft under practically all speeds.



The 12-cylinder V-model Allison motor which develops up to 500 h.p. at maximum speeds

The weight of the engine complete is about 4400 pounds and the bore and stroke of the twelve cylinders is 5½ by 7½ inches with a total piston displacement of 2138 cubic inches.

Some of the principal items of the specifications can be mentioned and will give a representative idea of the structural characteristics of these machines. The crankshaft is hollow, of the seven-bearing type, and 3½ inches in diameter. The connecting rods are of the forked pattern of conventional I-beam section, with a length of 15 inches between centers. They are drop-forged from chrome-nickel steel and machined all over.

The main and connecting rod bearings are of generous size of Non-Gran bronze and lined with high grade babbit by the centrifugal process.

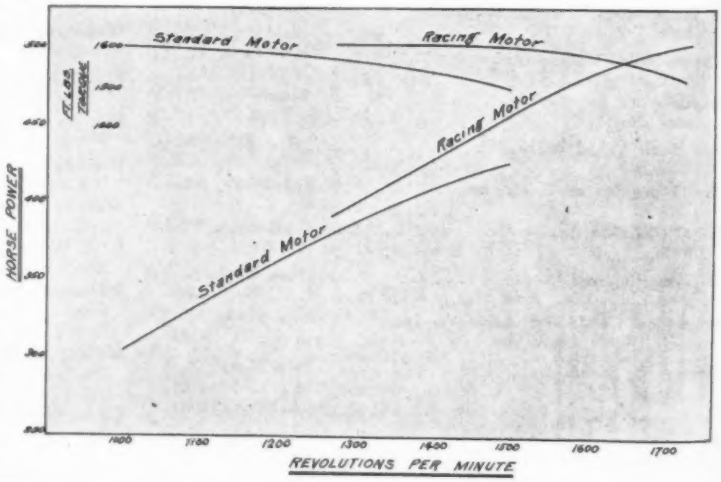
The pistons are carefully designed for lightness and heat conductivity and are equipped with floating piston pins 1⅝ inches diameter. Four piston rings are used above the piston pins. The bottom ring is beveled to act as a wiper ring and oil groove is cut in the pistons and drilled so as to return the oil back inside the piston and into the crankcase.

The lower half of the crankcase is of cast manganese bronze and carries the main bearings. The upper half of the crankcase is of cast aluminum alloy and supports the cylinders. Both cases are well ribbed and are very rigid. Large hand-holes insure easure of inspecting, adjusting or removing main and connecting rod bearings.

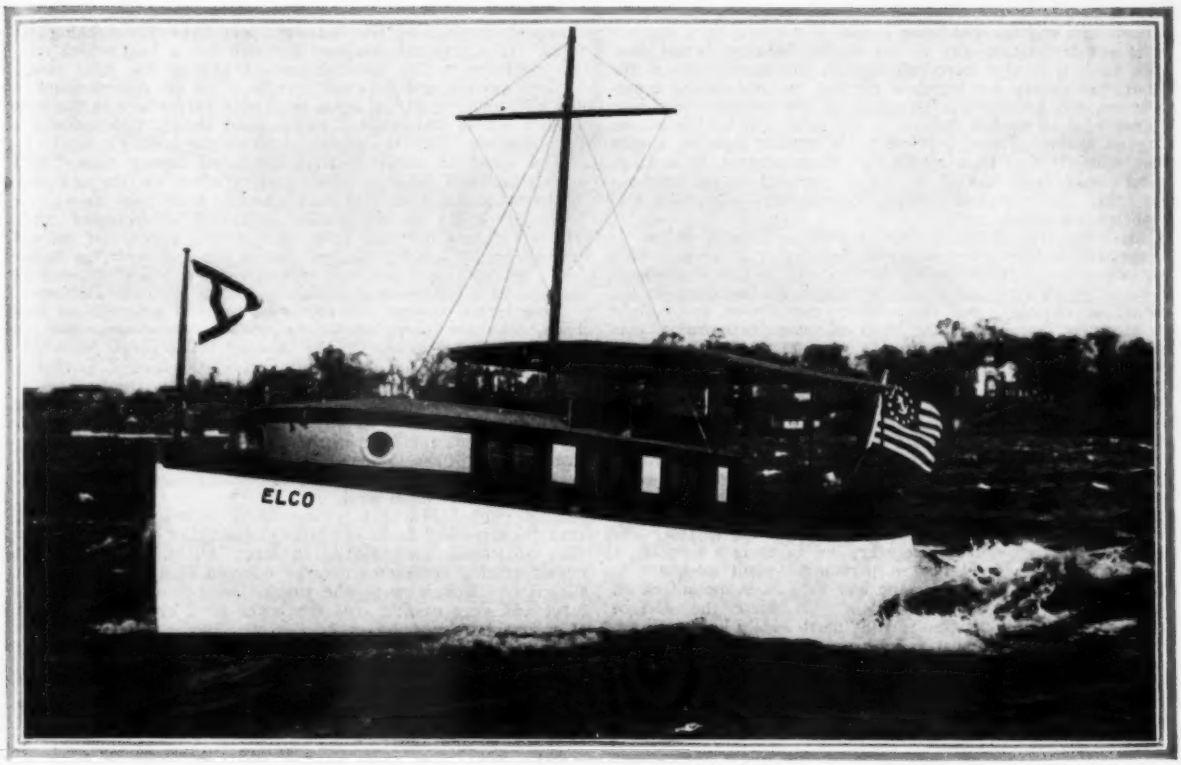
The cylinders are cast in blocks of three, of close-grain semi-steel. The water distribution around the heads has been carefully worked out to give thorough and uniform cooling. Ample water space is provided around the valve seats, valve stems and spark plugs. Two intake and two exhaust valves are in the head of each cylinder, the exhaust valves seating directly in the head, the intake valves in cages. Gas passages are large and unobstructed. Three spark plugs are in each cylinder. The cylinders are bolted to the upper half of the crankcase. Between each cylinder at the ends through bolts clamp the cylinder flange through the upper half of the case to the lower case, making a very strong and rigid assembly. The cylinder bolts and studs are of chrome-nickel steel and the nuts are nickel steel case-hardened.

Each cylinder has two intake and two exhaust valves 2 inches diameter in the clear with 30 degrees seats. The intake valves have a lift of 13/32 and the exhaust valves lift ⅜ inch. The valves are of tungsten steel or high chromium steel. Double valve springs are used on all valves. Each pair of valves is operated by a rocker arm, one end of which carries a roller operating directly on the camshaft.

Ignition is by means of two six-cylinder two-spark magnetos firing two plugs in each cylinder.



Horsepower and torque curves showing the power developed by both the standard and racing models of the 12-cylinder Allison marine motor



The product of standardization, a 33-foot Elco Cruisette

Education, Cooperation, Standardization

The Experiences of Years of Manufacturing Boats on a Standardized Basis Results In a Product Which Is Highly Developed and Complete

By Alfred F. Loomis

IT'S all very well for me to lean back in my chair, point my toes toward the drop-light over the desk and say: "The motor boat industry, though active for its twenty years, requires standardization, cooperation, and education to make it hale and hearty."

But if I make such an unqualified statement, some exceedingly practical and hard-headed captain of the industry may call me a theoretician, and ask me where I get off.

So I shall amend my remark to—

"Individual boat owners and prospective owners require education, must practise cooperation, and must accept the standardization idea in order that the motor boat industry may become as hale and hearty as it deserves to be."

That is much better. Let the owner's wrath fall where it may.

Now it is a matter of undisputed fact that the automobile industry controls the thought and taste of the buying public, subject, of course, to certain preferences which manifest themselves in the popularity of this or that particular car or accessory. The automobile manufacturer makes a standardized chassis, puts a standardized body on it and offers it to the public on its merits.

The individual buyer is not privileged to say, "I'll buy your car if you will equip it with this engine and that transmission and a different rear axle." He may choose, to be sure, among thirty or forty makes of a given price class, but the car he selects is identical with the cars of a thousand other buyers.

Occasionally he invests in a special, custom-built body, but when he does so he pays what is known as a good round sum for it. Vastly more than a similar stock article.

The motor boatman who reads these words may be a car owner as well. If so, he is one of the millions who have willingly purchased what the manufacturer had to offer, knowing that the experience of years of manufacture and of thousands of individuals who have preceded him in ownership of his type of car is worth vastly more than any preferences which he may entertain concerning speed, spring suspension, transmission, and the like. But as a motor boat owner, he is a vastly different member of humanity.

As a motor boat owner he demands expression of his individual ideas. If he doesn't build a boat himself he insists that someone else shall build it for him as he wants it. The lines shall be as he specifies, the arrangement according to his desires, the various units placed where he wants them and in no other place. He is boatwise and, although amenable to friendly suggestion, he will permit nobody to mould his tastes.

Consequently he puts himself in the class with the millionaire who orders a custom-built motor car body and pays a good round sum for it.

This substantiates my statement that motor boat buyers require education. They need to learn that exclusiveness comes high in this imperfectly regulated world of ours. It would certainly be exclusive to own a twelve-cylinder Ford, but wouldn't most motor car prospects with a hankering for a twelve-cylinder car sacrifice exclusiveness and buy one of standardized manufacture? Motor boatmen must sacrifice exclusiveness, individuality, and pet idiosyncrasies in

order to benefit by the reduction in prices which standardization of boats and engines will bring about.

The standardization idea in the marine industry is not new. Stock models, as they were called, were introduced early in the life of the industry, but somehow through the mistakes of manufacturers, the ignorance of owners, or the ordinary workings of chance, stock models received a bad name and buyers became wary of them. There developed the popular opinion among other opinions that if a model was manufactured by a large concern each boat carried so much overhead in its purchase price that an individually designed, one-man-built boat was cheap by comparison.

This is not true of the standardized motor boat of today. It is especially untrue when it is considered that a one-man boat must stand by itself, whereas a reliable, responsible firm stands back of the standardized boat. Service is all-important in the automobile business, and the orphan car whose fly-by-night manufacturer dissolved in the mists of yesterday morning, gets none of it. Service is also important in the marine industry, and it is unknown to the owners of boats which were built in woodsheds by transplanted house carpenters.

On this subject of service, which is inextricably linked with the education of motor boat enthusiasts I had an interesting talk the other day with Thomas S. Hanson, general manager of the Elco Works. Let me explain before repeating the gist of Mr. Hanson's views on service that the Elco people were among the first to embrace the standardization idea. They were so wedded to it that when the war came along they were able to build eight hundred-odd standardized submarine chasers for various governments and make every one of them a success.

The subchasers gave them a permanent plant adequate to any needs of peace, and since the war they have specialized on three or four standardized models. Of these the 33-foot Cruisette is the most popular and the most widely known.

Mr. Hanson believes that service starts before a boat is sold and consists at first in helping the prospective boat owner to decide what boat is best suited for his needs. A man who has observed in himself the symptoms of a strange malady, who, diagnosing the case, has discovered that the motor boat germ is coursing through his veins, goes to the Elco company and specifies, let us say, a 45-foot boat. Perhaps he wants a 45-footer and perhaps not. Mr. Hanson finds that out. If a 33-footer is best suited to his needs—factors which may include cruising grounds, purchase price, cost of maintenance, available crew, etc.—the prospect is urged to buy this less expensive model. This is service, which, in the long run, pays both buyer and builder.

Then, assuming that the budding boatman votes for the Cruisette model, he is shown a complete boat of this type, just as, along Automobile Row, the prospect is asked to inspect a complete motor car. He finds the boat hauled out and he has the opportunity to examine it from truck to keel, from stem to stern. Every detail of design is explained to him and he is told and shown exactly what equipment is included in the purchase price. He may buy that boat if he wants it, or he may take one already in the water, or one standing by on skids in the shop. In any event he is shown the action of the Cruisette at all speeds and is urged to handle her himself.

If the prospect becomes owner of the boat she is delivered to his home port under her own power when that is possible, and a shop man who makes the trip shows the owner how she is operated, and (it may be necessary in the case of a man who has not previously taken to the water) instills self-confidence in his veins. After the sale is made the Elco company does not lose interest in the boat or its purchaser. Service is definitely rendered.

An instance of this service is of more than usual interest. The owner of a Cruisette found, one morning, that his boat had grounded on a mud bank. Shortly after she had been hauled off the circulating pump jammed with mud and broke. Another incident of like nature was reported to the Elco company, and the two together were sufficient to induce the company's engineers to devise a way of preventing further recurrence of the accident. By experiment, coupling screws were found which had enough strength to drive the pump under all normal conditions, but which would shear and thus protect the pump from damage in the event of a clogging of the impeller. Two sets of these screws were then sent to every Cruisette owner, accompanied by a letter which explained the possible necessity for their use and urged their installation without delay. Since that time no Cruisette owner has reported pump trouble to the company.

The Elco service idea includes the winter storage of boats which are owned in the vicinity of New York. Storage is given under cover at a figure which is reasonable, but the principal value of the service is that before each boat is hauled out she is given an inspection by the company's designer or his chief assistant. A report of the inspection is filed for reference, and if, at any time during the winter, the owner desires to ship his boat to Florida or make other disposition of her, the company can inform him immediately what work she requires and exactly how soon it can be accomplished.

There is another phase of Elco service, and one which, if accepted throughout the industry, will have far-reaching results. If a prospect discloses a desire for a boat which does not conform to the specifications of any of the Elco standardized models, and does not care to adapt his requirements to the Elco models, Mr. Hanson invariably refers him to the boat builder whose standardized model most closely approaches his requirements. This is cooperation from the builder's side.

The spirit of cooperation if developed among motor boat enthusiasts will have an even greater effect on the industry. Hitherto, as has been said above, and as everybody knows, the individual wants his individuality expressed in his motor craft. He will own a car that looks like his neighbor's, but he will not ordinarily live in a house that is identical with his neighbor's, nor operate a boat that reflects another man's preferences. And he pays for his exclusiveness.

Now let us suppose that motor boatmen in general—not two here and three there, but the majority of those who seek relaxation on the water—can be induced to cooperate with one another, embrace the standardization idea. It will involve a sacrifice for each man, but a sacrifice with a recompense, as will presently be told. Jones must content himself with 10 miles an hour instead of 12; Smith be satisfied with sleeping accommodations for four instead of five; Robinson must submit to the tastes of the majority in the matter of chucks and other deck fittings, and so on. Each subordinates his personal preferences for the common weal.

That mutual benefit is expressed in dollars and cents. It may be expressed in hundreds of dollars, for by the construction of standardized models in large quantities tremendous manufacturing economies may be effected in a dozen different directions. For instance, the wooden pattern of a combination strut and skeg casting cost the buyer of a certain boat more than one hundred dollars—and it was never used again. If one hundred buyers had wanted that type of casting, the cost for the pattern, distributed among them, would have been negligible.

One of the finest six-cylinder motor car engines of today costs in the neighborhod of $200, exclusive of exterior fittings. It is sold at that figure in lots of 10,000. A six-cylinder marine motor of the same class costs in the neighborhood of $2,000, sold in lots of one. It is unreasonable to suppose that motor boats will ever be standardized to such an extent that shop orders of 10,000 will go through at one time. But as steadily and as rapidly as cooperation among boat buyers—pooling of tastes and preferences for the common good—permits production in quantity lots, just so steadily and rapidly will the price of a $2,000 motor decline toward $200.

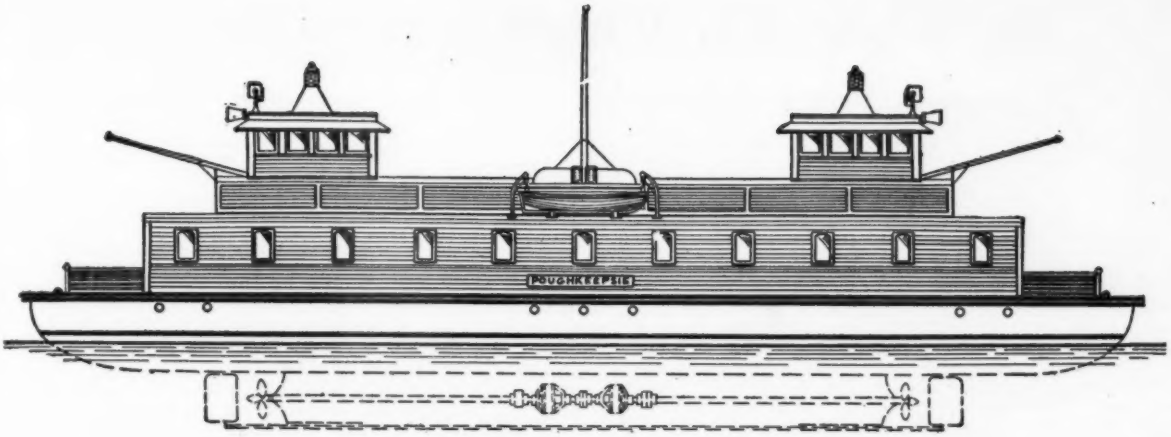
And the beauty of it is that everyone will profit through standardization. The owner will eventually pay half of the present purchase price of a given boat; the manufacturer will turn out better work at a larger total profit to himself, and the engine manufacturer, assured of a steady market for his product, may concentrate on fewer but better and more lucrative models. There is no joker in the standardization scheme; no one gains at the expense of others.

I am not making a plea for any one standardized boat or the product of any one company. I have mentioned the Elco company because in a talk with Mr. Hanson he gave me my text for an article on standardization and cited instances that give it point. The Elco company is one of the oldest and most reliable that concentrate on standardized craft, but it is by no means the only house in the industry which is devoting time and money to the perfection of certain definite types of motor boats. Other concerns as well are seeking in an open, honest fashion to convert lovers of the sport of motor boating to the benefits and advantages accruing through standardization. I believe that through cooperation of all—the education of owners and builders alike—these advantages will one day be realized.

The subject of standardization as applied to these boats would hardly be complete without reference to the motor used in them. One of the earliest exponents of standardization, particularly as applied to the building of motors, was J. Van Blerck, the head of the J. V. B. Motor Co., Akron, Ohio. His completely standardized motor is the one which is used in these Cruisettes.

This motor is of the four-cycle, four-cylinder, valve-in-the-head marine type and represents the highest achievement of its designer. The plant in which it is being built is devoted exclusively to the quantity production of this one engine, with the natural result that it is possible to furnish an engine of the highest quality. As a result of careful inspection, both of the raw material and while being processed, only perfect parts are built into the motors.

One of the very distinctive and valuable features for which the engine is famous is its reverse gear. This is a specially designed device of the sliding transmission type. It is so mounted that the entire housing can be removed, permitting easy access to the clutch. The gear has an absolutely neutral position which cannot be maintained with any other type of reverse gear. It will reverse for long periods of time with full power and without heating.



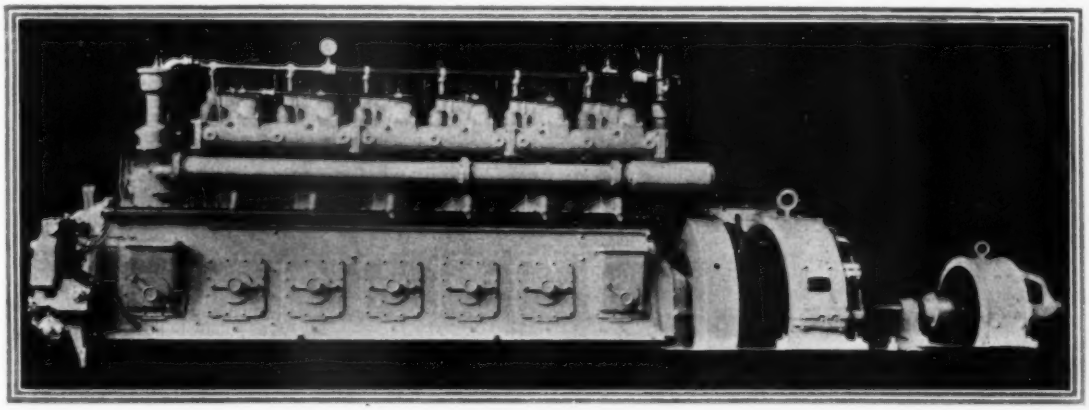
Profile view of the new Hudson River ferry-boat, Poughkeepsie

Diesel Electric Drive Applied to Ferry Service

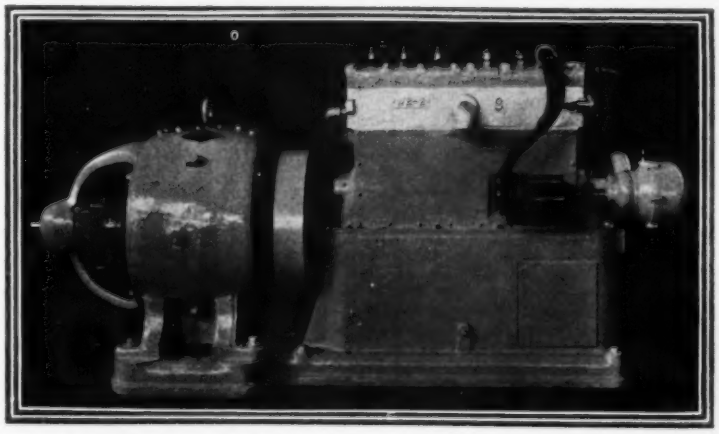
The First Commercial Vessel of This Type Using the Diesel Electric System of Propulsion Designed to Operate Under Severe Conditions

THE first application of the Diesel electric system of propulsion to be applied to a commercial vessel of the ferry-boat type is being made in the case of the new ferry-boat Poughkeepsie. Owing to the peculiar conditions of service under which this boat must operate, several unusual features have been incorporated into the design of the vessel. She is intended to operate across the Hudson River at Poughkeepsie on a run of about three-quarters of a mile. An unusually heavy seasonal traffic in automobiles during the summer months makes large deck capacity an essential feature. Due to the freezing of the river in the winter time and the necessity of maintaining traffic, the hull had to be designed to act as an ice breaker to keep its channel open.

For the propulsion machinery, a pair of 150 h.p. 6-cylinder Winton Diesel engines are being used. These drive a 90 k.w. generator at 450 revolutions, the current from which is, in turn, used to drive two 100 h.p. electric motors, directly coupled to the propeller shaft line. Double propellers are used, one at each end of the hull-fin. This novelty consists of a narrow hull extending below the keel line of the main body of the vessel, and serves to keep the propellers in deep water. The propelling machinery is so interconnected that either of the two motors or engines may be used as desired.



One of the large six-cylinder 150 h.p. Winton Diesel motors direct connected to the electric generator



The Winton gasoline-driven exciter unit, of which two are carried

While Rip Van Winkle Slept

Revolutionary Developments of Twenty Years in the Growth of the Gasoline Engine Recalled by One of the Pioneers in the Marine Motor Industry

By W. L. Fay

ONE of the most fascinating of comparisons is that of results set over against the number of steps and the length of time required to produce them. Great changes are usually so gradual that we accept as an ordinary matter that which had its development been sudden, would seem revolutionary.

As compared with many of the modern conveniences, the development of gasoline motor power has been so rapid and so recent it may be said to almost come under the head of revolution rather than evolution; but those who have been actually engaged in the business for the past twenty years find it most interesting to look back and compare those earlier days with the present. To interest the general reader, such a backward look must of necessity be only sketchy and reminiscent rather than technical.

Twenty years ago, the East coast was only beginning to realize what a gasoline motor was or of what it was capable. On the Pacific coast such engines were already an actual commercial asset, and it was no unusual thing to hear of a trading vessel equipped with as much as 500 horsepower of the four-cycle type. On the Atlantic coast, however, but few such engines were made, and those mostly in small powers, mostly the four-cycle type and extremely heavy. The Atlantic fishermen were still using oars in their dories and sail or steam power in the larger boats.

The earlier engines of the two-cycle type were of small power and used in pleasure boats (so-called!) and originated largely not on the coasts but in the Middle West. The old-timers will recall at least two names which were at that time well known in the trade and whose boats, from sixteen to forty feet long and with engines of the two-cycle type, were gradually being introduced on the lakes of New York and other eastern states. Aside from the then popular naphtha launch, whose engine was not of the explosive type but used the gasoline as fuel, the Atlantic coast states were doing but little relatively to some further west, although a number of makers were starting in the East and were just beginning to get their teeth in. About 450 was the highest r.p.m. and powers were small. One enterprising maker undertook to develop a single cylinder two-cycle machine capable of delivering 30 h.p., which was considered a freak, as indeed it was.

A list in the writer's desk, which is probably at least eighteen years old, contains among others the names of Truscott, Pierce, Racine, Monitor, Western, Lozier, Tuttle, Rochester, Rumsey, De Luxe, Howard, Eclipse, Sintz, Reid, Genesee, Eagle, Touquet, International, Dingfelder, Strelinger, Blomstrom, Superior, Remington, but few of which are active in the trade at this time.

To trace every feature of those times through its development down to the present would require an article which would lap over into several issues of this magazine. The electrical ignition alone would make most interesting reading, but the writer must confine himself to only a few of the high spots.

The increase of horsepower through the multiplication of cylinders was a comparatively early feature. Two, three and four-cylinder engines became common as people became convinced that they were not courting death by riding in the power boat of that day and power boats increased in size and such engines began to come into commercial use. Then, even as now, legislative ignorance was apparent. Faulty design resulting in occasional accident attracted the attention of our Solons in Washington and the writer has a letter from a Congressman of national reputation in which he referred to the gasoline engine as a dangerous missile!

Propellers on most of the smaller engines were of the reversing blade type, actuated by a sleeve around the propeller shaft. There were usually but two blades, although some were made with three and our own company at one time made a few three-blade reversing-blade wheels as large as thirty-six inches in diameter. In place of the usual lever, some of the larger were operated through a wheel and gear. The reversing clutch has a story all its own and it is comparatively only of late that such a device has become sufficiently dependable so that the owner thinks no more of it than of any other part of the power plant.

Fuel was fed through a generator valve, more commonly called a vaporizer. They certainly had their peculiarities. Among personal experiences about that time the writer recalls a windy summer afternoon on a New York lake in a rather heavy sea, himself sitting alongside a balky vaporizer endeavoring to get an adjustment which would make the engine hit evenly while Madame, the Captain, sat forward at the steering wheel (those were the days of long cockpits and short decks). A more than usually large wave hopped over and landed just under the Captain's chin, dampening her enthusiasm in two senses, with the result that a landing was made at the next hotel dock where we stayed (including supper) until the sea went down.

From twenty to perhaps ten years ago may be said to have been the golden age of the two-cycle engine. Its rapid decline, save in very small powers, appears to coincide with the vogue of the automobile. The motor car has done wonders for the four-stroke engine both in mechanical improvement and increased popularity and auto drivers soon began wondering why the general principles of their car engine were not applicable in boats. The two-cycle boat engine lost its grip and the familiar proverb regarding facility of descent was never better illustrated.

As already stated, most of the early engines of the four-stroke type were extremely heavy in comparison with their developed horsepower and they also were designed to operate at low revolutions. The motor car was responsible for the rapid development of a four-stroke engine, lighter, faster and of greater power in proportion to its weight, and the attention of marine engineers became directed toward producing engines which were to the boat what the auto engine was to the car.

Right here a mistake was made by many in getting their first four-cycle marine engines entirely too light. They ignored the fact which should have been apparent, namely, that the pleasure car engine works at full load only a very small percentage of its operating life, while the boat engine operates, so to speak, up-grade wide open nearly all the time and must be designed accordingly.

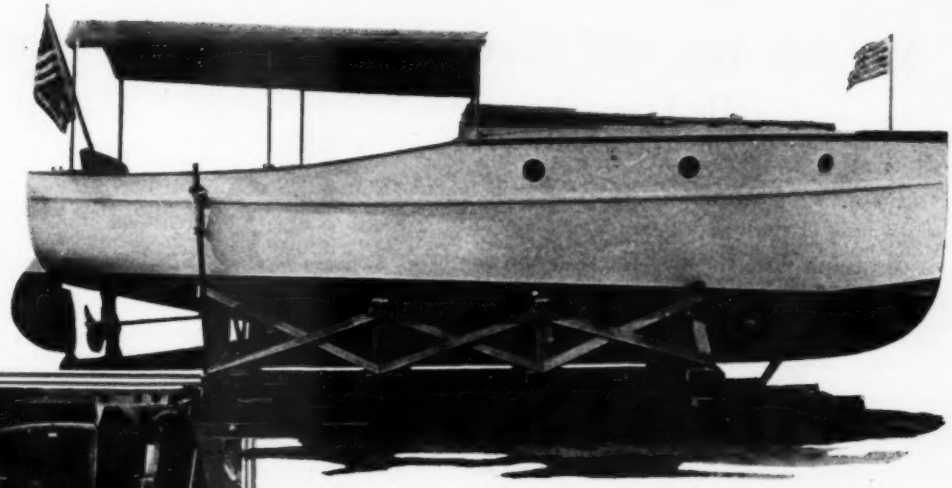
Picture to yourselves the extremes represented on one hand by the old type of four-cycle boat engine, so heavy as to be practically worthless for any pleasure craft except the most clumsy, and on the other hand by the modern light, powerful and flexible aeroplane engine, wonderful in action but frankly claiming a flying life of but a few hours without overhauling. Of the pleasure boat engine it can be said today without fear of contradiction that its designers have combined to a most remarkable degree all the best features of the extremes just cited as such features apply to modern boat propulsion. This development has been most rapid. The old war cry of the two-cycle man against the cams, valves and gears of the four-cycle type soon lost its force as the automobile gained in favor. Admitting that the two-cycle type is the simpler, it still would be an insult to the present intelligence of the public to claim that there is anything in the modern four-cycle pleasure boat engine to prevent its operation with entirely satisfactory results by the ordinary man or woman.

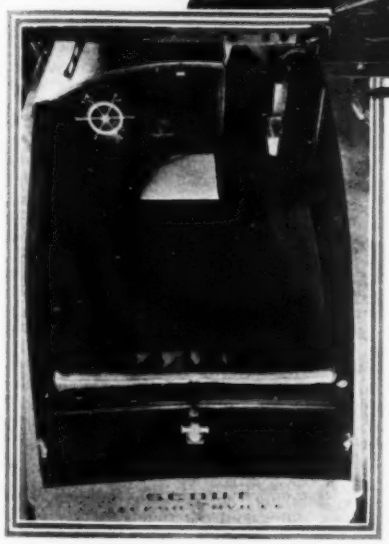
The last and one of the most trying drawbacks to pleasure in the operation of either car or boat was eliminated by the perfection of the electric starter.

The modern runabout power boat is practically a water automobile. The owner goes to his boat house as to his garage, seats himself comfortably behind an automobile type steering wheel, presses the button of his electric starter and is rewarded by the purr of the engine as promptly as in his car.

Having a practically constant load, he has no intermediate gear shifting and when clear of his boathouse, spark and throttle regulation permit of full speed ahead in a few seconds or he can slow down to a remarkable minimum. He is protected by a modern adjustable windshield. At night he touches a switch to throw on his lights and his guests can step into a cockpit lighted by Pullman electric lights. He notifies others of his approach by means of an electric horn. No sound comes from the exhaust and the appointments of his boat are luxurious throughout. Best of all, he can depend upon his engine to take him five miles, fifty miles or five hundred miles, asking only for gas and oil.

To paraphrase the Rev. John Jasper, "the world do move."

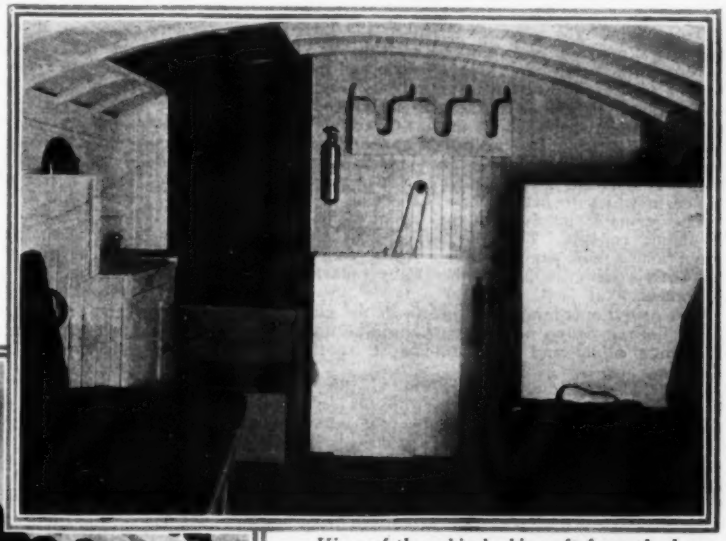




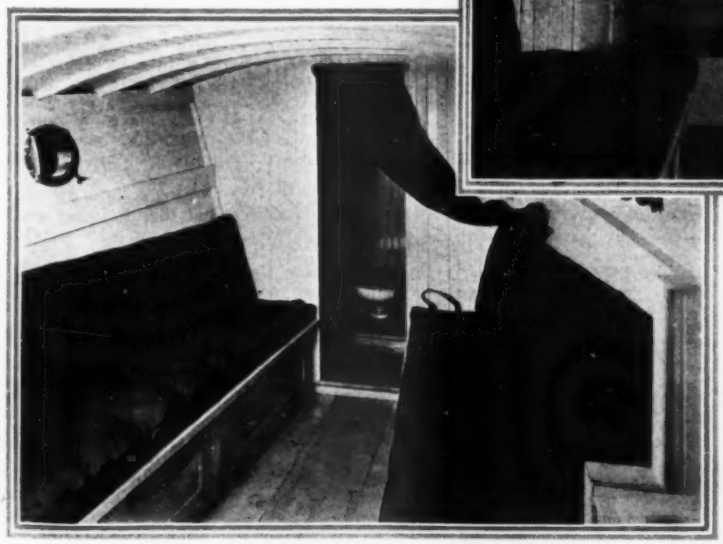
Bird's eye view of the cockpit

Scout, the 26-Foot Richardson Cruiser

A New Little Stock Boat to Be Built in Quantities at North Tonawanda, N. Y.



View of the cabin looking aft from the bow



Looking forward through the companionway door

ONE of the finest specimens of stock boat building, of which there are now quite a number in production, is the little 26-foot by 8-foot 6-inch cruiser Scout. Planned by Wm. J. Deed especially for the Richardson Boat Company of North Tonawanda, this little boat embodies many new and improved features, the result of long experience in designing and building boats of this type on the part of both designer and builder.

The predominating feature of this boat is the exceptionally large cockpit, yet it leaves very good cabin accommodations and perhaps the best feature here is the full head room. This allows the use of double berths by converting the backs into upper berths by swinging up in the usual manner. A good size toilet room forward and a fair sized galley with stove and locker space complete the arrangements. The essential idea has been a strong substantial little cruiser and speed has not been the leading consideration.

A sturdy two-cylinder Frisbie motor of 12 h.p. of the 4-cycle type has been selected, which is able to swing a big propeller wheel at a fairly slow rate of revolutions, making the most efficient proposition for the little boat.

The cockpit forms the outdoor space and a comfortable seat is built across the back. A small hatch built around the motor is at the forward end and the space is otherwise free from obstructions.

Unusually sturdy material enters into the hull. The keel, for example, is 3-inch oak and the frames of 1½-inch square selected white oak. Planking is finished to ⅞ inches.

Making Any Old Boat Permanently Watertight

The Value of Marine Glue In Making a Hull Entirely Waterproof and Serviceable

By L. W. Ferdinand

MANY a sail-motor or row-boat has been insured against leaking for many years to come by a few hours' work done at this time of the year. There are many who go on year after year doing a little calking, puttying and painting in a listless manner, knowing all the while that soon after the boat goes into service again it will spring more leaks.

Small wonder that those who have learned how to make their boats absolutely leakproof for a number of years are loud in their praises for the simple formula which has banished the bilge pump and the scoop and limited the wetting of the inside of the boat entirely to the water which comes in above the gunwhales.

Whether the boat is old or almost new make no difference. I have known of cases where boats which had been practically given up as unfit for further service have been made as tight as the proverbial drum after a few hours work and at a surprisingly small cost. These same boats have continued in service for years with never a trace of a leak and have outlived boats which were new when they were seemingly in the last stages of their careers.

To the men who have learned the value of marine glue on the hulls of all sorts of small craft, this narrative will have small interest, except that it may show a simpler way to do the job when they have other boats to leakproof.

Those who have never experienced the satisfaction of owning a leakproofed boat will do well to let an attentive eye rove over these lines and give a second and then a third thought to this process before they start any overhauling.

The materials needed are simple and inexpensive. They comprise sufficient unbleached muslin to cover the hull and the quantity of marine glue needed to spread freely over the entire outer surface of the boat. The implements consist of a stiff brush, a couple of heavy flatirons, a heater, and a suitable container in which to heat and melt the glue.

The principle involved in making any small craft leakproof is simple enough. The glue is, of course, absolutely waterproof and a hull painted with a heavy coat of hot glue must be waterproof even before the heavy unbleached cotton cloth is applied.

The operation of laying the cloth in the glue by ironing with a hot flatiron draws a portion of the glue up into the pores of the cloth, filling and waterproofing it, so that no water can soak in.

The cloth and the boat's bottom in this operation actually become as one, and neither water nor oil can permeate through them as long as the boards of the boat hold together.

The first thing to ascertain is how many square feet you wish to waterproof. With these figures in view you can order the correct amount of glue as you must allow one pound of glue to every three square of boat.

In the selection of the cloth do not be misled into buying canvas or cotton duck. The correct thing to use is heavy unbleached cotton cloth, of a good grade, firm and close in texture. You will buy this cloth in one entire length, which will represent more than twice the actual length of your boat, as you must allow for the bilge or hog and sheer. You will cut this big length in half yourself, using one piece on each side of your hull.

To find the proper width of the cloth to be used (you can get this heavy unbleached cotton cloth in any width) measure on the widest part of your boat from center of keel straight across the bottom and up the side as far as you wish the waterproofing to go. If the boat is lapstreaked it will be well to let the waterproofing go way up and under gunwhale. If your hull is made of matched boards, with flush seams, you need only to carry the waterproof two inches above the load water line. Do not stint yourself on cloth. It is cheap, so allow a little over on boat length and width.

You will also need one roll of good twill tape, one-half inch wide. At a paint shop, procure sufficient shellac to give one heavy coat to the surface after it is waterproofed. Obtain a package of one-half inch copper tacks. The brush to be used, and one that will work in good shape, is a common whiskbroom that has been worn or cut down to a stub, being sure that the binding strings of this whiskbroom are holding the straws firmly. Otherwise, secure a common wire sinkbrush.

Your boat needs practically no preparation previous to the waterproofing process, except that the hull be dry and clean and all loose paint removed and the stem band at the bow is removed. Her age, and the general condition of her bottom means nothing at all.

The first operation is to stretch the cloth. This is best done on the hull itself, as it allows the cloth to set to the lines of the boat. Take the port side, tack the cloth over the stern-piece or transom, then draw the cloth taut toward the bow and tack right onto the bow piece. Fasten the cloth in several places along the keel. Then draw snugly over the sides of the boat, and pull up as far above the water line as you wish, securing in place with the small copper tacks. Repeat as directed with the piece of cloth to go on the starboard side of the hull. Allow the cloth to stretch about twenty-four hours and then remove it temporarily. If, upon examination at any time while stretching, the cloth seems to have slacked up in places, just remove the nearest copper tack and pull down taut once more and retack in place.

You are now ready to paint the bottom and sides with the glue. Place a couple of flatirons on a stove to warm up. Flatirons weighing about seven pounds each will work easiest and best. Now cut up a quantity of the glue into small pieces about an inch or two square. Drop these pieces into a pot, cauldron or jacketed kettle, set over a moderate fire. If a regular stove is not handy, a small two-wick kerosene stove, set right down beside the boat will do.

Keep stirring the glue as it melts, adding small pieces from time to time. Do not melt up too much glue at one time. As soon as the glue has melted into practically a liquid it should be used as quickly as possible. So, with your brush, start at the after end of your boat on each side and work forward, painting on a heavy coat of this hot glue. Do not miss any places on the boat. As soon as the glue starts to string out and get cold, stop applying to the hull. Return to the stove and add more pieces of glue.

After you have painted the hull with a good coating of the glue, it is well to go about and touch up any places where perhaps you did not get on as heavy a coating as you wished.

Now comes the process of laying the cloth on the glue. To look at the hull in its present state, with the rough surface made by the glue that has hardened in lumps all over it, makes you imagine that there is still a big job on your hands. But this proves not to be the case.

Stretch on the port side of your boat the piece of cloth that belongs there, just as you did when stretching it originally. Be sure the flat-iron is good and hot, but not enough to scorch the cloth.

Start on the extreme bottom at the stern, right at the keel and apply the hot iron, moving it slowly with a wobbling motion, right and left on its own axis. Do not iron. This makes the glue sweat through at this place, and as soon as the glue has been drawn through so that the cloth is black, move the iron to another place. Proceed in this manner all over the side of the boat, working forward and toward the gunwhale or load water line.

On the keel, be sure the cloth from both sides laps over the entire width, or bottom edge of keel, and that it is perfectly waterproofed and well ironed down. On the bow piece see that the cloth is well drawn over and ironed down in good shape. A few copper tacks may help at the bow and a few, here and there, along the bottom of the keel. Trim off all rough edges and extra cloth found left hanging on keel and bow.

On the stern the cloth must lap over not more than one inch on the transom and ironed down in good shape.

Cut two pieces of the cloth two inches wide and in length sufficient to reach from keel along the joint, made by transom of boat and side boards coming together, and to reach up to and under the gunwhale. A piece will be used at this place on each side of the boat. Start at the keel, allow one inch of cloth to be on bottom and side of boat and the balance to lap over on the transom, this completely covering the stern joints.

Tack the cloth carefully into place with the small copper tacks on about an inch center. When this is done, apply a hot iron and waterproof carefully.

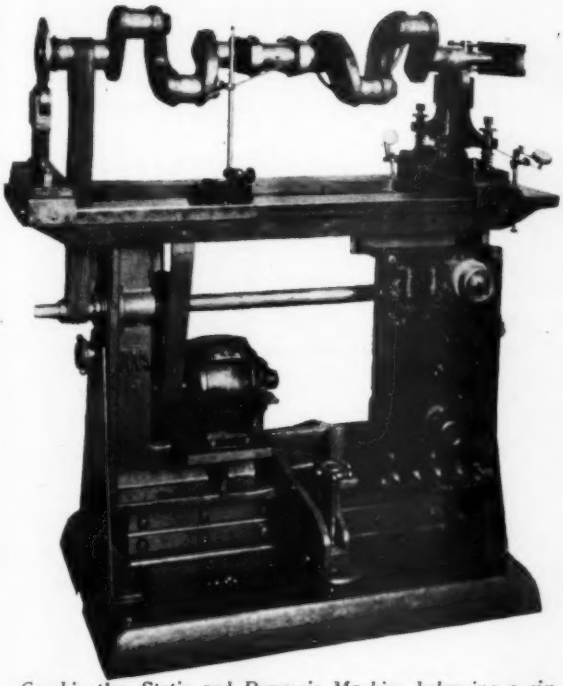
It is well now to go all over the bottom and sides of your hull feeling for lumps or rough places in the cloth. This is caused by more glue being under one particular spot than another, or not perfectly sweat through. When such a place is found, the hot iron is applied and it becomes smooth. Then give the entire surface a heavy coat of shellac and paint any desired color.

An examination of your hull after completion of this process will be a revelation to you. You will find that the cloth and the bottom of the boat have become one representing a very hard

(*Continued on page* 44)

Reducing Vibration

The High State of Development Reached by the Present Day Gasoline Motor Requires Perfectly Balanced Rotating Parts



Combination Static and Dynamic Machine balancing a six throw crankshaft

DURING the past ten years the internal combustion engine has been developed to a high degree of perfection as regards reliability of operation. No one any longer questions its ability to take him to a given destination and bring him back again. Any engine that does not possess these elemental qualifications can not survive.

It is only natural that, following the successful evolution of the engine to the point where it is reliable and runs on present day gasoline with reasonable economy, there should be a well defined demand on the part of the public for its refinement. They are demanding of the manufacturer freedom from annoying vibration in his engine. They are no longer willing to accept his explanation that the rough running observed at one or two speeds is only a manifestation of the tremendous reserve power in the engine. They are beginning to appreciate the fact that if the crankshaft, flywheel, clutch and perhaps the propeller, are put in perfect running balance the operation can be made exceedingly smooth at all speeds. This means less noise, longer life of the bearings, less wear and tear in general, and above all, perfect comfort to the owner, with no need to avoid certain speeds.

For a number of years the Vibration Specialty Company, Harrison Building, Philadelphia, Pa., of which N. W. Akimoff, the internationally known specialist in vibration and balancing problems, is president, has been supplying manufacturers with machines and methods for accomplishing this result. Their machines, which are used in the American and foreign navies as well as in some of the larger and more progressive industrial plants, are built in various sizes to handle any type or size of motor weighing from a few pounds up to many tons.

Their No. 1 NWA Combination Static and Dynamic Machine is shown with a six throw crankshaft in position for balancing. A small electric motor drives the shaft while small dial indicators near the right of the table show the condition of balance. On the end of the shaft is the balancing clamp which is used to neutralize the unbalance in the shaft. From the clamp position, when the indicators remain stationary, the position and amount of the necessary correction to give perfect static and dynamic balance is quickly obtained. All guessing is eliminated and the correction can be made according to the indications of the machine with absolute confidence that the result will be perfect. It takes only a few minutes to get the indications, which means a considerable saving in time as well as insuring a uniformly smooth running motor. In addition to the crankshaft, the flywheel and clutch should be balanced to insure good results.

Although the Vibration Specialty Company furnishes equipment principally to manufacturers, a Laboratory of Balance is maintained in Philadelphia where they are prepared to handle work for individuals. They have recently issued an interesting booklet entitled Vibrations, which they will be glad to send to anyone interested, on request.

A 14-ton intermediate gear for double reduction, as mounted on test bearings

Topaz maintains a cruising speed of 15 m.p.h. with a pair of dual valve 6-cylinder Sterling motors rated at 225 h.p. at 1500 revolutions. As installed their maximum is 1450 r.p.m. yielding 18 miles. They turn 24 by 18-inch propellers. The engine room also houses a Matthews one k.w. full automatic lighting set

The owner's quarters are in tinted shades with mahogany trim. The deck house is finished entirely in mahogany and the windows in it drop flush with the sill so that when they are open there is nothing to obstruct the view. Ample staterooms and guest rooms are provided in the after part of the boat

Topaz, a Rhode Island Cruiser

A Type of Yacht Which Is Becoming Increasingly Popular With the Discriminating Yachtsman

Topaz is a handsome cruiser. She was built and designed by Frederick S. Nock at East Greenwich, Rhode Island, and is 77 feet long by 15 feet 2 inches beam. Her construction is fairly light although particular attention has been paid to structural strength. A hot water heating plant is carried in the galley

Made In the U. S. A.—Engines

The Opportunity of the American Manufacturer Is Here—We Have Been Making Engines of Exceptional Quality and Must Not Fall Behind the Rest of the World

By C. J. Pope

Universal Motor Co.

BEFORE the engine manufacturers of the United States today lies opportunity. The opportunity to be the largest engine manufacturers in the world and at the same time—the greatest of engine makers.

England was making cutlery, and middle Europe wearing fine linens, cloth of gold and making tapestries, when we were born, but we had an even start with the rest of the world in the engine game, and have never neglected it. And we have been, whether consciously or unconsciously, laying the ground—paving the way—with no uncertain hand, for leadership in this direction for the last twenty years.

Whether we open the door to opportunity and stretch forth the right kind of a welcoming hand is another question. But the stability of the background upon which these claims are based lifts them out of the class of mushroom plannings which we are hearing all about us, whose rash and unconsidered assertions of world conquest in the commercial field have no base for their claims other than a few hectic schemes to take advantage of the present unsettled condition of affairs and Europe's temporary withdrawal from the markets. For while we cannot get very far today in discussing any question, especially a business question, without prefacing it with "before or since the war"—because the war did so much unsettling and rearranging of the world's business affairs—whether or not it caused as much real uprooting as some think, remains to be seen.

The theory of a new deal all around and for every man a new golden opportunity has not seemed to work out. We find doctors, lawyers, merchants and chiefs, who marched away in 1917 vowing that the world was before them and that they would never come back to a humdrum existence again—back, and glad to be back, and able to do business in the old town once more.

However, the seepage has set in; and every man is again finding his level. Just so with the over-capitalized business concerns with which we are ridden and the inferior manufactured articles that took the place of better ones during an abnormal condition in trade. And when it is all over we will perhaps be surprised to find that fundamentals have not changed much. That opportunity has been able to bring out only what was already there.

The United States finds itself at the present moment one of the greatest—if not the greatest—of manufacturers in the world. And the burning question with the American manufacturer today is, "How will it affect me when my old-time competitors come back into the market?"

The answer is entirely up to the individual manufacturer. What the world wants today and has always wanted is—the product. It has little interest in where or by whom anything is made so long as it gets what it wants at a satisfactory price. Up to 1914 our makers of inferior quality goods had always asserted that the people of the United States wanted goods with a foreign label; that it made little difference to them whether the article in question was inferior or not, as long as it was imported. To meet this situation, which they possibly believed to be the true state of affairs, many manufacturers and dealers combined to create the impression that it was impossible to tell domestic from imported goods and that many of our own products were in reality foreign makes, and vice versa.

But when the war had cut us off from the rest of the world, it took the American public just the same length of time as it took to clean out the goods stored in our warehouses and upon our shelves, to discover which articles our factories could make equal to like imported articles and which we could not. The net result is an intelligent but insistent demand for the old time foreign imports that they preferred to domestic makes, while the call for home made standard products remains unchanged.

We cannot recall having ever heard anyone, during the period of the recent war, bemoan the fact that he or she was unable to get foreign made shoes! Nor have we since; nor will we ever hear such complaint as long as our boot and shoe manufacturers continue to lead the world in well made footwear as they do today. When Americans go abroad they make very sure that they have enough shoes to last until their return. In other words, you cannot sell us foreign made shoes, because our own are the best made shoes in the world!

And this holds true in a greater or lesser degree with other of our better class of domestic made goods. But it does not mean that dozens of new and untried concerns, or old ones with low standards, can jump in at this period and successfully compete with the tried and proven craftsmen of the old world with centuries of painstaking effort behind them, when they get under normal production again.

It is true that with the low cost of labor in many foreign countries today and the correspondingly high price of material which they must import from elsewhere there is a very marked tendency in many foreign lands to turn out an inferior article. Our domestic markets are being flooded to a greater extent than ever before with cheap articles of foreign manufacture.

Herein lies the opportunity of the American made engine. We have been making engines—engines of an exceptionally high standard—practically ever since the invention of the first steam engine. And we have never lagged behind the rest of the world either in ingenuity or craftsmanship in this particular field.

And while we do not claim to have all others backed off the map, as it were, the way the Americans have with shoes, and Germany had with toys—still during the four years that America was forced to use her own products we never heard, even those of us who were in a most advantageous position to hear, any complaints about American made engines, or anything that approached an unappeased desire for foreign makes!

The needs of the war, while it served to bring before the world the fact that the United States could produce unaided, either as to materials, engineering, or workmanship, high grade engines in record breaking time, did not, in reality, fundamentally affect our relationship as engine makers with our overseas competitors. We have always had many advantages over them if we but learn to grasp and take advantage of the difference between real and apparent advantages.

First and foremost, we must recognize the advantage which our unlimited supply of raw materials necessary to turn out complete engines will give us in price over the country which must make costly importations of such supplies.

Second, we have made no bad mistakes, no blunders to live down, either in engineering or standard of quality. In the case of the gasoline engine, the United States has contributed as much toward its development as any other country in the world; in fact, at the present moment it stands supreme from a marketable standpoint.

In making this statement consideration is given to these qualities: Utility, adaptability, weight per horsepower, and simplicity of construction and design. The last named qualities—simplicity of construction and design—carrying with them as they do an advantage to the inexperienced user—increasing his chances of correct use of an engine and reducing his troubles when repairs are needed—must not be underestimated, for it is the point from which we must work if we wish to lead the world's markets. We must keep our engines as simple as it is possible while maintaining a maximum of efficiency and workmanship.

The advantages and vast experience of the American manufacturer, particularly as applied to quantity production are such as to permit him to easily take a leading position in the world's production today.

The elimination of weight and bulkiness as factors in export trade is a point which makes itself.

Germany led the world with heavy duty oil engines, and there is no reason to suppose that this title can be wrested from her lightly. We must learn that we must work for every step that we gain now as never before. France and Germany have taught us that the expense of experimental departments is the money we have spent most wisely. But America has still to learn to set a premium upon initiative and not be eaten up by standardization. We can also take a leaf from the old world's book upon craftsmanship. Pride in our product and a lasting reputation rather than quick profits must be our slogan and the results will amply justify our greatest expectations.

We need not go into the growing field, the increasing demand for engines of every description and for every purpose. For the world seems fairly to be sitting up and calling for engines, and still more engines!

And someone always makes and sells what the world's markets demand! In this case there is every logical reason why it should be our own country who holds those markets by the right of superiority.

Putting the Cart Before the Horse

By Electrical Methods of Propulsion the Towed Boat Can Supply the Power for the Towing Boat — Review of the Development of the Electric Motor Boats Dawn and New Era

By William T. Donnelly

PREVIOUS to 1914, the writer had been shipmate with every known kind of propelling power that has been applied to small vessel propulsion, commencing with steam, long before the explosion or internal combustion engine had developed any reliability. Next to steam came the naphtha launch propelled by vapor of gasoline, then called naphtha, the heat being furnished by burning the exhaust of the engine. The fire risk drove this craft from the sea together with the further development of the internal combustion engine which rendered it at least approximately reliable.

By 1914 we began to hear something of the term speed boat. By that time the internal combustion engine was coming into its own and was appearing as a reliable and dependable means of applying power to small boats. The application, however, necessitated the reversing clutch or gears and the use of electricity for ignition either by low tension make and break which for many years was most popular, or jump spark with high tension magneto or spark coil.

About this time, the writer's familiarity with electricity in many fields of its application directed his attention to the possibility of using electricity generated by a gasoline or internal combustion engine, for the propulsion of yachts and small boats. The engineering investigation was carried on very carefully and thoroughly with the result that in 1914 the designs were completed for a 50 foot cruiser of 12 foot beam, and approximately 4 foot draft, to be propelled by a 20 horse power electric motor, the power to be furnished from a 40 K. W. generator driven at what was then considered a very high rate of speed, 450 revolutions per minute, by a Lamb gasoline engine.

It will be at once apparent that a 40 K. W. generator was more than twice the capacity of the motor used to propel the boat. This construction was adopted from the fact that the writer had in view a still greater and more radical innovation, that is, the possibility at some future time of building a second yacht from which gasoline and its power plant with all the accompanying noise, confusion, oil and odors, were to be excluded. This was however, so radical an idea at the time of the construction of the first boat that it was held in abeyance until the practicability of driving a yacht electrically from an internal combustion engine was fully demonstrated.

Upon the completion of the plans, very careful investigation was made in and about New York to locate dependable parties in whose hands construction could be placed. This resulted in a contract for the hull being placed with Hehre & Auer, two young and energetic boat builders, located at Clason Point, on Pugsley's Creek, Bronx. It being understood that the writer took entire responsibility for the power plant, its installation and operation. In fact the power plant was completed and set up in running order in the plant of the C. & C. Electric Company at Garwood, New Jersey, and operated under full load before the hull was completed.

This yacht, known as Dawn, was completed and put into commission in September 1914 and proved herself to be in many respects the superior of any craft with which the writer had ever been shipmated. Dawn cruised in and about New York waters and eastward on Long Island Sound during the summers of 1915 and 1916, and in May 1917 was put into commission by a volunteer war crew consisting of my son, Norman E. Donnelly, and six of his schoolmates, and sailed about May 7th from the Bayside Yacht Club, Bayside, Long Island, bound for Newport, Rhode Island. On arriving there, she became one of the section patrol boats and continued in that service until the summer of 1918 when she was returned by her naval crew to the builders' yard at Clason Point, under electric power which had answered all tests of war work, not only through summer but through winter weather, having a record of fifty-six hours continuous operation in a blizzard off Newport with the thermometer below zero.

Dawn was re-commissioned as a yacht without change in the power plant and used around Long Island Sound and in New York waters.

In the meantime, the writer had completed plans for the companion boat previously referred to and this boat, New Era, was launched in October 1919 and in November of that year, Dawn with the original power plant, furnished power for herself and New Era in a cruise up the Hudson to Albany and through the Barge Canal to Schenectady and return. This was the first application of electricity generated on one boat for the propulsion of another, and furnished not only the power for propulsion but electricity in ample quantities for all other domestic purposes such as lighting, cooking, heating, etc.

The following spring and summer, the upper works of Dawn were rebuilt and an entirely new power plant installed, consisting of an 80 h.p. 4 cylinder Van Blerck engine, operating a 50 K. W. General Electric generator, and on Oct. 10th, Dawn and New Era in convoy, started on a most unique cruise through the inland waterway down the coast from New York to Florida. The party consisted of a crew of two on Dawn and the owner with his wife, son and daughter, on New Era. The boats headed south, journeyed leisurely along with the idea of keeping just ahead of the cold weather. Every city on the Atlantic coast was visited, including Washington, where a stop of a week or ten days was made. The outside passage from Beaufort, North Carolina, to Charleston, South Carolina, a distance of 250 miles, was negotiated in two runs, stop being made at Southport, at the mouth of the Cape Fear River. Jacksonville, Florida, was reached on the last day of January, and the cruise continued 200 miles up the St. Johns River to the city of Sanford, where the boats remained until the first of April. The return trip to New York was made between the first of April and the twenty-eighth of May, and the boats sailed into their home port at the Bayside Yacht Club for opening day. A cruise to the Great Lakes followed and was succeeded by the annual journey to Florida.

The foregoing is a record of almost two years' continuous operation in which the boats met all kinds and conditions of weather, and have been a source of admiration and wonder in every city they have visited, and have served the writer as an ideal home afloat, far surpassing his most sanguine anticipation.

Guided by experience as related, and while Dawn and New Era were on their first cruise south, their builders, Hehre & Auer at the Clason Point plant, now re-christened Dawn Boat & Shipbuilding Corporation, were fitting out the electric power cruiser, Lightnin, a 40 foot boat, 8 foot 6 inches beam, and 30 inch draft. This boat can be seen on exhibition on the main floor of the Grand Central Palace occupying a prominent place at the exhibition of the National Association of Engine & Boat Manufacturers. The power plant of Lightnin is intended to be the last word as applied to electric propulsion. It comprises two separate and distinct electric generating plants designed to furnish power for a single motor directly connected to the propeller. It is to be understood that either power plant will drive the boat independently, or both acting in series will drive it at its maximum speed. The control, while similar, is even more simple than that of the automobile, in that the various speeds, backwards and forwards, are controlled by a single handle operating an electric rheostat.

It should be understood that with electricity, full speed of the propeller is obtained in both directions without the necessity of a reversing gear or other mechanism.

Electricity at 110 volts is available while under way or at anchor, for all domestic purposes, such as lighting, heating, cooking, etc., and in this connection, it should be understood that all standard electrical appliances such as are used in the modern home, can be utilized without change.

Supplies of all kinds are arranged for rapid inspection at the salesroom of the E. J. Willis Co.

Motor Boat Accessories of Repute

Prominent New York Supply House Builds Reputation on the Quality of Merchandise Carried as Well as Superior Service Rendered

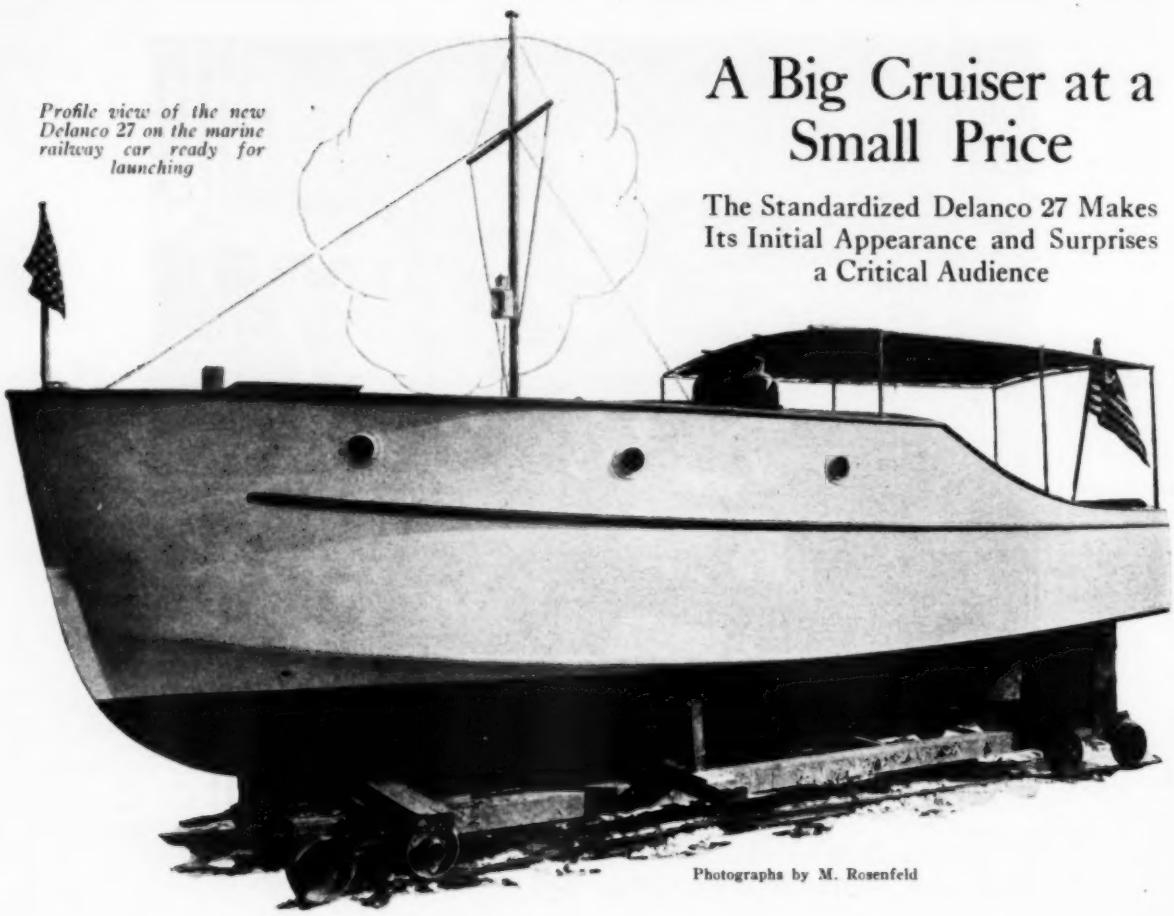
INDICATIVE of the trend of the times and the increased interest being taken in the sport of motor boating, is the activity in the business of the accessory dealers. The E. J. Willis Co., a long established firm specializing in marine supplies, particularly of the type required by yachtsmen and motor boat operators, have been compelled to enlarge their departments and devote greater attention than ever before to this branch. W. E. Willis, who has returned to the establishment after an absence of several years, has undertaken the management and rejuvenation of the business to keep pace with the demands upon it. It has been found that the requirements of the business were such that the stocks previously carried were entirely insufficient. This situation has been remedied by apportioning definite stock spaces for each individual item carried in stock. For example, cleats in both galvanized iron and brass in every imaginable size are stored in individual bins. The particular novelty in this arrangement is that the sizes of these bins have been very carefully thought out so that they will hold all the required stock estimated for the maximum demand, and also considering the time necessary to replace the item in question. Such items as can be replaced quickly from manufacturers in New York City or close by do not require to be stocked as heavily as articles which are manufactured in Detroit, where the shipping time to New York is a considerable one. The entire stocks are arranged on this system, and the stock clerk has only to examine the bins in order to tell when it is time to reorder material. It has been made his duty to see that all bins are kept full.

Attractive show window display of motor boat supplies and accessories; a prominent feature is the original painting of one of MoToR BoatinG's famous cover designs

Naturally, the business of a company doing business in this branch is not limited to retail sales alone. One of the strongest statements which they make is that all orders received by mail are shipped the same day the order is received. A new catalogue illustrating the full marine hardware and accessories carried is ready. Copies of this catalogue will be sent to anyone who will take the trouble to write to the E. J. Willis Co., 85 Chambers Street, New York, N. Y.

A Big Cruiser at a Small Price

The Standardized Delanco 27 Makes Its Initial Appearance and Surprises a Critical Audience



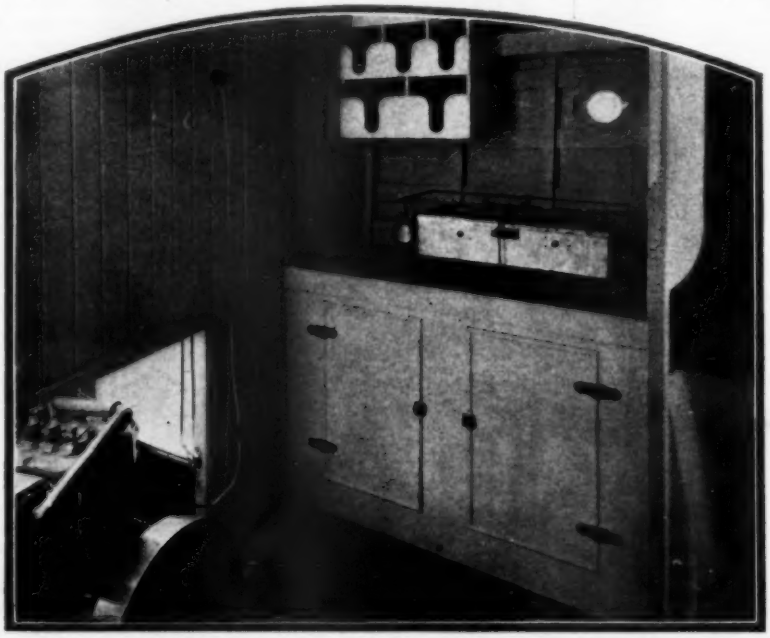
Profile view of the new Delanco 27 on the marine railway car ready for launching

Photographs by M. Rosenfeld

THE first Delanco 27 standardized cruiser is finished. A party of critical experts was invited to the plant of the Delanco Shipbuilding Company one cold Saturday not long ago to inspect it. Previous to seeing the boat, remarks were freely made, such as "They can't do it" or "It can't be done." Referring, of course, to the advertised slogan, "A complete Delanco 27 for $1,500." However, it can be done, for the boat is complete, and has turned out to be a very excellent job all the way through.

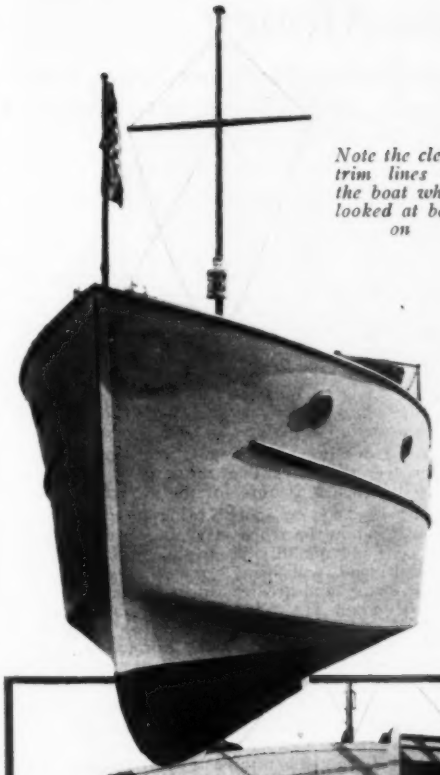
There are now being built at the plant of the company further examples of the same boat, and the experience acquired in constructing the first one is being applied to the complete standardization of the future models.

The officers of the company, which incidentally is an old established concern, were frankly pleased at the favorable comments about their pet. Henry F. Miller, the president, who, in addition to directing the affairs of this company, finds time to serve in the Pennsylvania State Legislature and act as a director in the Media Title and Trust Company, as well as being the manager of the Philadelphia branch of Henry Kesell Company, ship chandlers, is mainly responsible for the development of this boat. Willard S. Harris, a prominent Philadelphia admiralty attorney, is vice-president of the company.

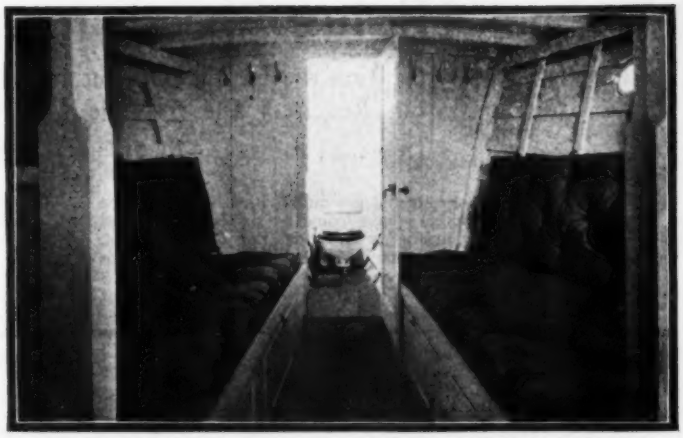


A corner of the spacious galley, cupboards and lockers as well as a high grade stove are included

The plant which has built many tugs, barges, and other boats for our government during the war period, suffered along with the general decline in all shipping industries. In casting about for a way to keep the organization intact and keep the plant in operation, the subject of building a standardized small boat was suggested and fell on fertile ground. Warren C. Strugnell, secretary of the company,



Note the clean trim lines of the boat when looked at bow on



Looking forward in the cabin of the Delanco 27. Cushions and berths are soft and roomy

To-day the problem consists in assembling parts into the hull and completing them as expeditiously as possible. By means of the complete standardization, the parts can all be prepared in advance and assembled into place at the proper moment.

No effort has been spared in the construction of this boat. As the work advanced it was noticed that this or that piece could be lightened or perhaps omitted to reduce the cost. These savings were not made and the plans of the designer were followed in every particular, despite the greater expense. The completed boat to-day stands on its own merit, and nowhere can greater value be received for moneys expended.

This little boat is a thoroughly practical outfit. Naturally, there are no brass fittings which require continuous polishing, nor are there mahogany rails and trim to keep brightly varnished. But who wants to polish his life away on a boat. Good, clean, serviceable white paint has been applied to the woodwork, and the interior and exterior of the boat both are ready for the finest cruise you can imagine. She is staunchly built and powered with the popular Kermath 16 h.p. four-cylinder four-cycle motor. This produces speed enough so that the boat will hold her own and even outstrip many others.

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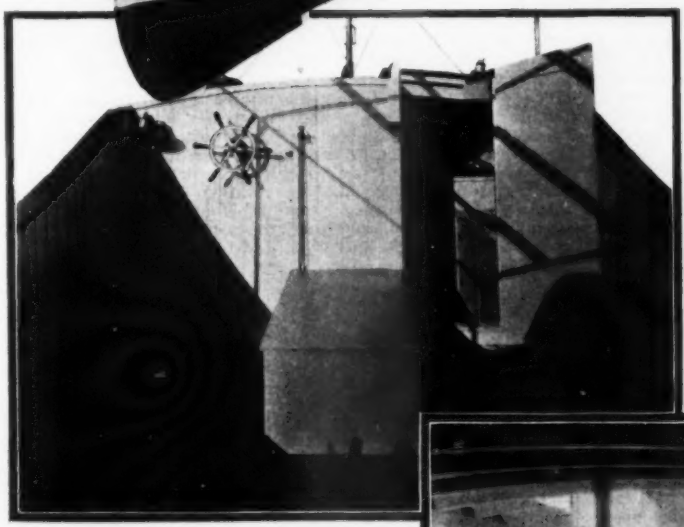


The steerman's position in the cockpit. Engine controls are handy and the motor is just underneath the cover

and also vice-president of the S. & M. Dye Works, in which industry he is an expert and holds first rank, took the matter up with J. Murray Watts, the well-known Philadelphia naval architect. The results of the conference led to the design of the boat and the beginning of its construction. The idea which was kept before everyone connected with the boat was not how expensive a boat can we build, but rather how good can we build to sell at a moderate price. We all know that it is an easy task to build a little boat to sell for $3,000 to $4,000, and we also know that to build a boat, completely equipped for $1,500 and ready to sail away after filling the tanks, is an entirely different problem. Patterns and templets were made for each individual stick of wood which goes into the hull.

Looking aft in the cabin; the engine flywheel projects just far enough inside to make starting easy

Higher Speeds for Less Money

Through Standardization the Express Cruiser and Runabout, With Moderate Power, Can Be Brought Within Reach of the Average Man — Future of the Sedan Day Cruiser

By G. F. Swartout,
Stearns Motor Mfg. Co.

SINCE the phrase, get out and get under, lost its significance and meaning, motor cars have come to supply the method by which all other means of transportation are compared, yet the dyed-in-the-wool boatman is patient and long-suffering and he will endure and even embrace weaknesses in his boat and marine engine which he would not tolerate for a minute in his car. He has come up through a time when he could expect no better and he is more or less in a rut. He will purchase a 30 to 40 h.p. car and enjoy a spin through the country at 20 to 40 miles an hour; yet he will put a small 2 to 10 h.p. kicker in his boat and plod along at 5 to 10 miles per hour going nowhere and getting nowhere, yet this is sport and herein lies a great salient point—that motor boating has fascination enough to hold its devotees under conditions of this kind. Of course, there are exceptions to this rule. Some sections of the country are awake to the possibilities of modern boats and engines.

But even in these boating centers, the surface is merely scratched and ten times as many fast runabouts and small express cruisers could be absorbed and would be, if it was generally known that a thoroughly high grade boat and power plant can be produced today at but a fraction of the cost of such an outfit even a year or two back.

There is a great future for a type of boat that has not been much talked of as yet, nor have many ever been built, but it would seem that from the standpoint of initial outlay, small upkeep and operating expense and great speed possibilities with small power, that it is the real boat for the man of somewhat restricted means. The sedan day cruiser is in reality a glorified runabout made serviceable for more extended use. A few so-called sedan runabouts have been built, but they have apparently not found great favor to date, but it would seem that with a lower price and a more practical cabin that they could be made more desirable. In the 26, 28 and 30 foot sizes, the sedan cabin could merely have seating accommodations and in the larger models, 32 to 40 foot in length, there could be built a very comfortable lounging cabin with toilet, small galley equipment and even convertible berths and an enclosed driving cockpit in the forward end of the cabin that could be opened up or enclosed at will.

There are, of course, a class of boatmen who love to pit their resources against the wiles of the elements and their boats will always be auxiliaries and heavy cruisers, but the great rank and file of us are of the fair weather variety and our craft should be designed, built and powered accordingly. Broadly speaking, pleasure boating is confined to protected or semi-protected waters and the bright fair summer days when business bores us and we must get away.

The modern express runabout and cruiser is not necessarily an over-powered, noisy, expensive, racing proposition and something a man of average means should avoid. To the contrary, they are quiet, clean cut, stable, and dignified craft, which are capable of performing as our motor cars do.

There is greater exhilaration, thrill and recreation at 20 to 30 miles per hour over the water, than the same speed in a car, so why not enjoy it, when it is ours for the asking.

An extensive movement is on foot to bring the price of such boats and equipment within the reach of average means. Standardization of models and quantity production will attain these results. Greater demand will bring greater production, and consequently lower prices and greater values. Therefore, when one goes into the market for a boat, let him investigate the standardized models at right prices; engines that are compact, sturdy, powerful and economical at equally fair prices, and buy accordingly and enjoy boating as cannot be done with any other equipment.

Speeds that are moderately fast, say, 18 to 30 miles per hour, are extremely safe and are attainable with very moderate power and consequent low fuel consumption both in small cruisers, sedan type and open runabouts, whereas slightly higher speeds require double the power and far greater initial cost and upkeep. Moderately fast boats will, in most cases, travel as far or farther on a filling of gas and oil, than the ponderous heavy and slow outfit. One is then enabled to put his power boat to greater usefulness, to take the vacation or week-end trip or the extended Sunday jaunt that would otherwise be spent less profitably and interestingly and the pleasure power craft thus comes into its own.

Pick the Motor That Will Serve You

Avoid Converted Automobile Engines and In the Selection of Your Marine Motor Look for Superior Vitality, Extreme Accessibility, and Thorough Lubrication

By J. A. Manning,
Knox Motors Associates

EVERY motor boat enthusiast has tucked away somewhere down deep in his heart a desire to some day own an honest-to-goodness engine; an engine that can be depended upon to give satisfactory motor service at a moderate first cost and a low operating cost. The average owner's idea of a successful engine is one whose steady hum installs confidence and a feeling of safety. He likes to have the cool breeze and the flying spray fan his cheek as he glides steadily onward, to be sure, but better still he likes the feeling of assurance that the engine, the heart of a boat on which so much depends, will take him there and bring him back without a mishap.

What are some of the main points that the prospective purchaser should look for in a marine engine of up to date design? What has he a right to expect that a manufacturer has built into the product he offers?

First let me warn the buyer against the use of a converted automobile engine if he would be assured of dependable power. Marine service is much more severe than is encountered in the automobile field. There are no loafing periods for the marine engine. It is just one long grind. Smooth, steady engine performance is usually the determining factor when the success of a boat as a producer is considered. For this reason the work the engine is going to be called upon to do must be thoroughly analyzed before the design is even started. It takes years of experience combined with a scientific study of service requirements to build a truly successful marine engine, and to deserve to be called successful a marine motor must have superior vitality, extreme accessibility, absolutely thorough lubrication, absence of vibration and be of sufficient weight for strength and durability. The automobile engine in marine service does not come up to these requirements.

If the use of automobile engines in marine work had proven practical there would not be a single marine engine builder in business today. The manufacturer of marine engines should not be satisfied with just selling you a motor that will run faultlessly when it comes from the factory brand new and in perfect adjustment. The success of his business depends on the motor giving you the same service next year, the year after, and in fact for years to come if you care to use it that long. The only way to build this permanency into the motor is by the use of nothing but the best materials, the highest grade of workmanship, and the most developed design.

The most vital part of any motor is its crankshaft, for a sizable crankshaft makes an engine easy on itself and on the boat. The crankshaft is the backbone around which the entire power plant is built. It is the crankshaft that bears the brunt of the burden. It carries the load and sustains the shock of quick starts and stops. A sturdy crankshaft plays an important part in earning and maintaining the reputation of any engine builder. Look to the crakshaft and be convinced that it is rugged enough to stand the strain of heavy work day in and day out, as this will add a great deal to the pleasure and comfort of your boating.

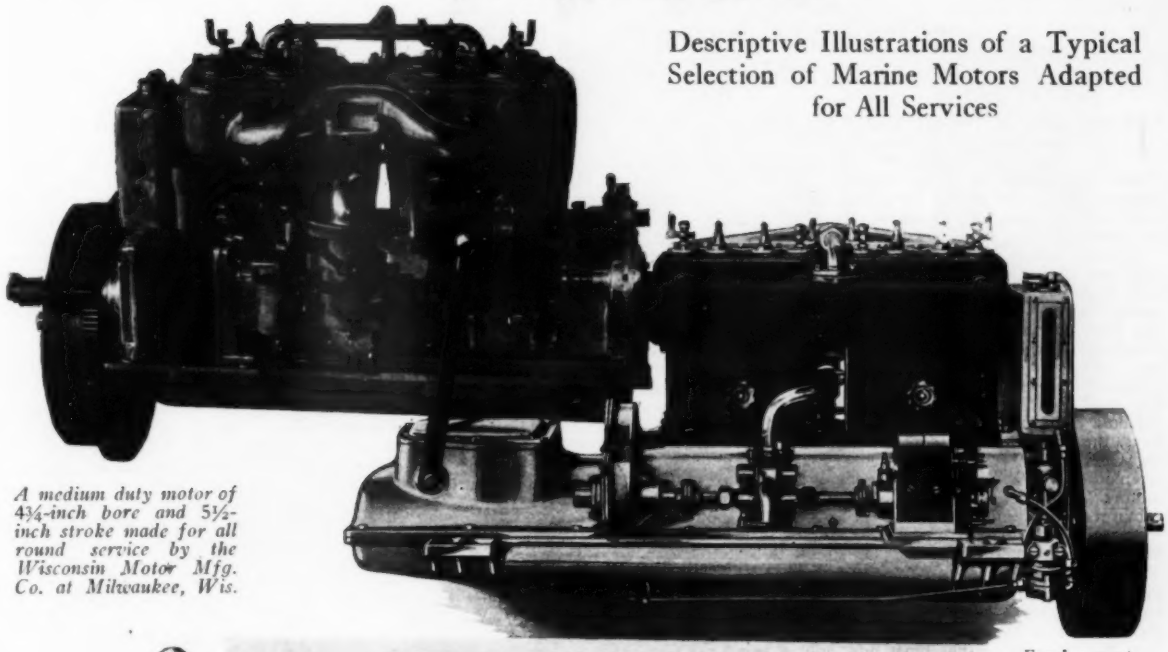
Within the past few years new standards of efficiency have been established. Better principles of automotive engineering practices have been adopted so that marine engines of the more recent designs are to be preferred. These attain an unusual degree of efficiency in power and fuel economy. They start easier, have a quicker pick-up, are more flexible, and may be operated and controlled with greater ease.

The ideal engine for the small cruiser or runabout should be a

(*Continued on page* 46)

The Consistent Motor

Descriptive Illustrations of a Typical Selection of Marine Motors Adapted for All Services



A medium duty motor of 4¼-inch bore and 5½-inch stroke made for all round service by the Wisconsin Motor Mfg. Co. at Milwaukee, Wis.

Exhaust side of a smaller motor, with a bore of 3¾ inches and stroke of 5 inches called model C M

A six-cylinder motor which produces up to 80 h.p. on a weight of 1,125 pounds

A racing motor for the speedster. Model J R M develops from 50 to 110 h. p. according to the speed operated

Intake side of the powerful model P M, bore 5¾ inches and stroke 7 inches, develops 130 h.p. at 1200 r. p. m.

Keeping Abreast of the Times

The Tremendous Advance in the Development of the Internal Combustion Motor is Met by Makers of Reverse Gears

THE Snow & Petrelli Mfg. Co. of New Haven, Conn., has been making Reverse Gears on a commercial scale since early in 1906 when the company was organized. While not claiming to be the originator of Reversing Gears, this company has been in the forefront of Reverse Gear development for 16 years and is among the first to make and market its devices on a commercial basis.

During this period many changes have taken place. Not only has there been a tremendous advance in the development and improvement in internal combustion motors for all purposes, but the development and use of them in the marine field has been most remarkable encompassing as it does, such a tremendous advance in power, efficiency, economy and range of use. When the first Joes Gear was designed, the formula this company of necessity adopted was The most possible gear in the least possible space for the least possible price. This formula has long since gone into the discard, but in those early days, the vast majority of motors were sold without a Reversing Gear, which compelled the gear maker to find his market on motors already installed. Today a large percentage of all motors are fitted with Joes Reverse Gears by the motor manufacturers, and ample provision is made to accommodate the Reverse Gears, and in many instances to incorporate them in the bed of the motors.

Today instead of the demand for very light compact gears, the motor manufacturers, with unfortunately a few exceptions, require a Reverse Gear that must be adequate and as efficient and durable as the motor, and require as little relative attention, and at a price that must add only a small percentage to the cost of the motor. The result of this rapid and radical development has not only encouraged the gear manufacturers in the field to greatly improve and extend their lines, but has attracted many new makers into the field, some of whom may endure, but more often they fall by the wayside. Without trying to analyze the why and wherefore so many rush in to revolutionize the market on an article of so necessarily restricted demand as a reverse gear, it is fair to assume, however, that nobody has yet produced a device so perfect that it cannot be improved, or one that will entirely satisfy everybody in all respects. Therefore a man with the big idea sets his brain at work and produces what others have failed to do, namely: the acme of perfection, and proceeds to make it and to monopolize the market. The brains, energy and courage of the American inventor have given our country its great prestige in mechanical fields, and while he seldom succeeds in gaining all he dreamed of, he generally adds something of usefulness to the art, which others may profit by, even though as the originator he often fails of commercial success.

While it is the policy of the Snow & Petrelli Mfg. Co. to work along original and independent lines, it has also been their policy to keep abreast of, if not in the lead of up-to-date reverse gear development. This policy has led them into making many improvements and innovations which, from a purely pecuniary standpoint is expensive and not always profitable. This company was apparently the first to recognize the fact that a reversing gear reasonably satisfactory for medium speed motors of moderate power might be and usually is entirely unsuited to very heavy duty slow speed motors, and equally unsuited to very high speed high power motors in racing or other speed craft.

Therefore to meet the demand for a suitable gear for big oil burning diesel and semi-diesel motors Joes Husky Gear was produced. This gear is constructed along lines to give it the greatest strength, durability and adaptability, both as to installation and operation. Joes Husky Gear is husky not only in name, but in nature and can be relied upon for the heaviest duty. This gear has recently undergone minor changes of construction which have not only enhanced its general qualities of strength and adaptability, but the new reverse band adjustment is a. b. c. even to the novice, and it is more often the novice or the man of limited experience that is relied upon to engineer motor boats. Joes Husky Gear reverses the propeller at 85 per cent of the motor speed which is an advantage over slow reverse speed gears that cannot be overestimated particularly for heavy duty motors.

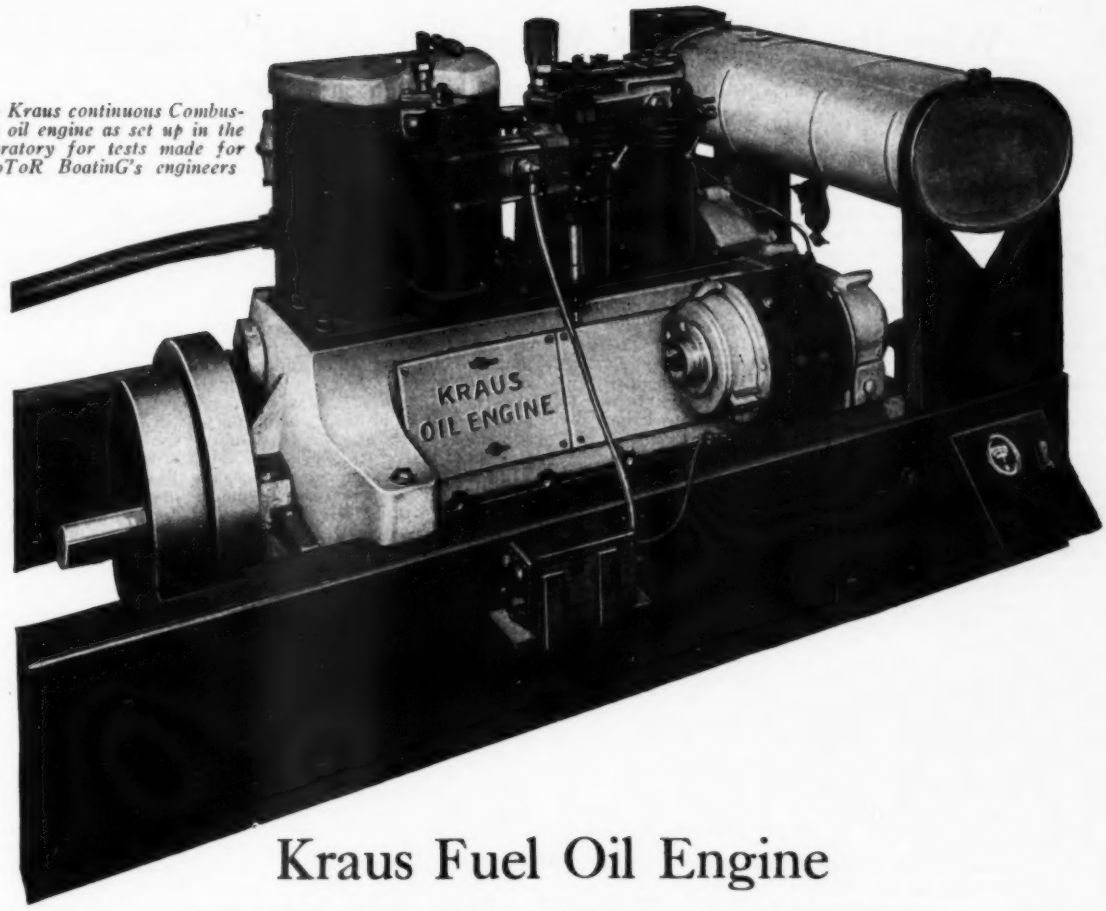
Joes Duplex Drive Gear which has stood the test of time and hard service, has been modified to make it more readily adaptable to any motor it is suitable for. To this end, it is being supplied with a detachable flange on the engine end which enables a motor manufacturer or dealer to have in stock a flange of the proper bore or to rebore one to suit his customer without the necessity of carrying several gears of a size in stock or waiting to have one sent specially bored from a distant factory, and thereby losing a sale to the customer who can't wait. The Duplex Drive Gear has also been given even more backing power and a greatly increased Neutral Zone, both of these qualities are essential in gears like the Duplex Drive, which have a reverse speed ratio as high as 88 per cent and can back the boat at all the speed the motor is capable of. Joes Duplex Drive Gear largely because it is Duplex Drive has been the most successful racing gear yet produced. Driving ahead as it does, through Duplex disc clutches, and not through locked gear teeth, a comparatively small light gear transmits the terrific power of 12 cylinder motors and never falls down at the crucial moment in a race. One special gear of this type weighing only 170 lbs. transmits the power of a motor rated 450 h.p. at 1800 r.p.m. In other words, the gear has less than two-fifths of a pound of metal for every horsepower transmitted, while the motor itself has nearer two pounds of metal per horsepower developed.

Joes High Power Gears. When the No. 17 gear of this type was exhibited for the first time at the New York Show a competitor came along and said with fine sarcasm, "What's that little runt for, a watch charm?" Well, that little runt and its descendants have transmitted the power of thousands of 4 cylinder 4 cycle motors rated by their manufacturers as 10-12 h.p., even if it does weigh only 18 pounds. That "little runt" also reverses at 80 per cent motor speed and makes an ideal gear to incorporate with small motors to make the unit complete. His older brother weighing about 40 lbs, No. 27, has the same relative power and pep.

To meet the demand for an enclosed gear in pleasure or passenger boats, Joes Enclosed Gear No. 330, of the high power type is ideal. This gear is furnished with rear and thrust bearings complete, incorporated in the housing and with a flange at each end. This makes installation quick and easy, and the oil tight housing supplies perfect lubrication to all parts of the gear. The adjustment is very simple and easily reached by removing the hand hold plate on top of the housing.

This complete line of Joes Reverse Gears, One-way Clutches and Safety Rear Starters should not be overlooked, and no motor boat man or would-be motor boat man can afford to equip without getting the valuable data on these devices mailed free upon application, or better still, call at Booth 67, Mezzanine, and get the information at first hand.

Several types of Husky Reverse Gears made with internal gear drive, non-cramping brakeband, and other features of value



The Kraus continuous Combustion oil engine as set up in the laboratory for tests made for MoToR BoatinG's engineers

Kraus Fuel Oil Engine

A New Principle in Engines Which Requires Neither Carbureter nor Ignition Systems and Burns Any Fluid Fuel Oil

A REVOLUTIONARY principle in internal combustion engineering is disclosed in the Kraus oil engine. The peculiarity of this motor over the generally accepted types is marked. It is distinctly a high speed machine which operates on any of the heavy and cheapest grades of crude, vegetable, or fuel oils. At a time when the difficulty of supplying sufficient gasolene to meet the heavy demand is a problem which even the oil companies are unable to solve, the advent of a machine of this type will do much to relieve this demand.

Engines of the ordinary type which will include Diesel or Semi-Diesel, operating on any fuel whatever, will carbonize more or less rapidly. Their limitations with respect to weights and speeds also will bar them from the fields of light and inexpensive motors. Essentially the Kraus oil engine is an internal combustion machine in which air is compressed in separate compression cylinders and mixed with a jet of atomized oil and ignited by an electric spark. Once this jet of gas has become ignited it burns continuously, and the resulting hot flame of perfect combustion is brought into contact with small quantities of water which cool the gases to a working temperature. At the same time, a desirable amount of steam is generated, which, combined with the gases of combustion, enters the power cylinders and performs work upon the pistons, producing a smooth and continuous power. The result is the elimination of hot gases and excessive temperatures within the working cylinder. The most efficient temperature is used for the power stroke and the expansive power of the steam is used in practically the same way as occurs in a steam engine.

No gasolene is required in any form. Starting is accomplished directly with the oil without any previous heating by means of hand or mechanical cranking. Only one spark plug is used with a simple coil, and this only for igniting the initial jet of gas at the beginning of operations. Once this has been lighted it is no longer necessary, as the operation from then on is automatic. The control of the motor is decidedly simple, a mere use of the throttle being sufficient to regulate the speed of the motor from low to high and any intermediate condition.

The motor will pull with maximum torque at low speeds, owing to the expansive powers of the steam which actuates it. The highest pressure in the cylinders is constant during a period of the downward stroke and while the piston and crank are in a position fully to utilize this pressure. The air compressor works continuously and the possible speed of the engine is limited only by mechanical considerations, such as valve proportions, balance and weight of reciprocating parts, etc.

No heat loss takes place through the water jackets. The cooling water enters the exhaust manifold, passes around the working cylinders and when heated to practically the boiling point, is admitted into the gas jet and converted to steam as mentioned previously. Due to this, cycle carbon deposits are entirely unknown, and the cylinders remain at all times in a clean and normal condition.

The heating takes place under constant pressure, and a high thermal efficiency is obtained as a result. This combined with the low pressure exhaust and the high mean effective pressure results in a high degree of economy. Pure air only is taken into the engine. None of the cylinder volume is occupied by exploded gas.

Owing to the simplicity of the construction the engine may be constructed for high or low working pressures, early or late cutoff with various types of valves as with steam engines. Similarly the engine is easily made directly reversible, a most valuable feature for marine service.

The Kraus Oil Engine Company whose executive offices are at 50 Church Street, New York, are planning to issue licenses to manufacturers under their patents.

Why the Wisconsin Motor Is Called Consistent

A Personally Conducted Tour Through the Plant of the Wisconsin Motor Manufacturing Co.

By H. M. Cronk,
Wisconsin Motor Mfg. Co.

THERE are just two ways to build a gasoline engine—a right way, and a wrong way. There is no intermediate point—no room for compromise.

To build an engine that was right was the principle upon which the Wisconsin Motor Mfg. Company was founded in 1911, and this principle has been carried at a sacrifice up to the present day. I say at a sacrifice because it is inevitable that quantity must be sacrificed for quality. Individuality to each engine is the safeguard to the buyer, for when mass production is paramount, it is inevitable that a relaxation of methods will prevail. In the Wisconsin plant of today, although grown to many times its original size, the same rigid inspection, the same careful selection of the very best of materials, is embodied in every engine that leaves its doors; and because of the uniform service rendered by every engine, it has earned the title of The Consistent Motor. Consistent was bestowed upon the Wisconsin by the hundreds of users who day-in and day-out, and year after year had ever dependable power when they wanted it. There is a wonderful sense of security in the feeling that under any condition and at any time, the power is at the driver's command.

Through these pages, we want to take you on a trip through the Wisconsin plant and endeavor to show how the motor earns the name Consistent.

Before starting on our tour of inspection, let me introduce the men in the Wisconsin Company who are responsible for its standing today. In the front office, we will find H. W. Schnetzky, President and General Manager of the Company. His middle initial stands for Work, and his slogan is Quality and Service to the customer.

Office number two belongs to our Chief Engineer, Mr. Milbrath, who is responsible for the design of the Wisconsin Motor, and who faithfully guards its reputation. He doesn't say much but when it comes to motors whatever he says is worth while listening to.

H. R. Mickelson, Works Manager, occupies the next office and he is responsible for the successful and efficient operation of the factory.

Mr. Gilles is our treasurer and smiles occasionally even in times like these.

We will start with the order for a motor which John Smith sends to us. Right here, let me say that this means something more than just another order for a motor. It means that John Smith wants a Wisconsin Motor, and the motor plus service that John Smith gets will make him an everlasting booster. As a result, his order is given just as much attention as though he had ordered a hundred. This is just another example of individual attention.

The order is then placed in the factory and we will begin with the rough stock department. All of the rough castings we will find out-of-doors where they are seasoned for at least four months. This seasoning will eliminate the possibility of any warping in the castings after the motor is built. Before machining is started, all castings are sandblasted.

In machine-shop number one are the big milling machines where the two ends and top of the crankcase are finished in one operation. Here also are found the Bullards for turning flywheels and the lathes and other machines for the machining of smaller parts. In every department In process inspection of material is required. Material purchased is given a chemical analysis test to insure its being up to specifications.

Machine shop number two houses the Multiple Drills and Grinders. Here the cylinders are ground to exact size. Throughout the factory, all jigs and fixtures are checked at regular intervals for exactness and the operators of the various machines are skilled mechanics.

In the sub-assembly, we find the men assembling bearings in the connecting rods, fitting the crankcase with bearings, caps, and studs, and fitting pistons and rings to cylinder bores. The selection of a set of connecting rods for a motor is made very carefully as they must be balanced as to weight. The same is true of the pistons. The main bearings are sized to each journal with special reamers and then lapped until they have 100 per cent bearing. Fitting pistons to cylinder is another very careful operation, as they are held to limits of .004 clearance.

Assembling of the engine is the next step and let us here check up the materials of which the various units are made. Upper and lower crankcase are aluminum. Crankshaft is chrome nickel steel, tested strength 140,000 pounds to the square inch—all bearings are bronze-backed lined with babbitt metal —laminated shims are used throughout—gears are of drop forged steel—cylinders and pistons are of the finest grade of gray iron. Please remember that in every department, we meet the In process inspectors who check all parts and make possible a one hundred per cent perfect assembly.

From the assembly, we go to the testing room. When the motor first reaches this department, it is run by belt power and tested for possible oil leaks for three hours. It is then put on its own power for a four hour test. Finishing this run, it is taken down, the cylinder bores inspected, bearings taken up, if necessary, and then put back on the block for final test. When the engine leaves the block, it is absolutely free and can be easily cranked by hand.

The motor is now ready for the shipping room where it is painted and finished in a handsome battleship gray. It is then substantially crated for shipment, and another Wisconsin Consistent is on its way to faithfully perform its duty.

The Varnish That Won't Turn White

Reasons Why the Chemical Changes Which Take Place in Varnish Under the Action of Water Injure Its Protective Qualities

By A. C. Kleberg,
Valentine & Company

UNTIL a few years ago, it was a generally accepted axiom in the varnish industry that all varnishes would turn white if exposed long enough to water.

When L. V. Pulsifer, now chief chemist and vice-president of Valentine & Company, first started with the company, he devoted himself to the technical side of varnish making. At that time it was our practice to determine the comparative weather resisting properties of two or more similar varnishes by submerging in warm water a black japanned panel finished with the varnishes being tested. The differing length of time before the varnishes succumbed to the whitening caused by the water was a fair indication of their comparative wearing qualities. They all turned white in a short time, but some turned quicker than others.

One day when making such a test, Mr. Pulsifer asked the late C. S. Homer (then chief chemist) why the company did not make a varnish that would not turn white. With a laugh came the reply, "It can't be done!" Mr. Pulsifer asked if it had ever been tried and was told, "countless times but never successfully." He then asked permission to try once more and it was given with the statement that, "while the result would undoubtedly be another failure, he would probably learn many useful things concerning varnish materials and so would not be wholly wasting his time."

In studying the effect of water on varnish it was noted by Mr. Pulsifer that there were two forms of whitening—one that was temporary, and one that was permanent. Let us consider first the former case.

Temporary whitening is familiar to all of us. It is often seen where dew or rain lies on a varnished surface. A white appearance results, but after a few hours of sunshine this disappears. The white appearance is caused by the water penetrating the varnish film. No chemical change in the varnish takes place. In fact the varnish is not white, but merely appears so. The white appearance is caused by light rays being broken up and diffused by the water particles in the varnish film. To illustrate this take a bottle containing a little water; pour benzole which floats on water, into the bottle. Each liquid is clear and colorless. Shake the bottle up, mixing water and benzole together and the contents of the bottle appear white! After a few

minutes the benzole separates from the water and each liquid is clear again. No change has taken place in either liquid, but when they are mixed together light rays passing through are diffused, giving the white appearance.

Permanent whitening, on the other hand, is quite a different matter. Here the water combines chemically with two or more ingredients of varnish, forming new compounds which are white. A varnish so affected can never regain its original appearance—and it has lost not only its brilliancy but also the major part of its protective quality.

After establishing these facts the problem presented was clear cut—to produce a varnish that dries to so dense and waterproof a film that no moisture whatever could penetrate and cause temporary whitening; and one so chemically constructed that water, hot or cold, no matter how long the test, could not break up the varnish chemically and form these white compounds.

Five years of painstaking research in both laboratory and plant which involved thousands of chemical experiments, resulted in Mr. Pulsifer's invention and perfection of a varnish which not only did not turn white in water, but which for the first time combined great speed of drying and hardening with extreme elasticity and durability. This varnish was named Valspar, now known the world over as the varnish that won't turn white.

Such were the successive steps in creating Valspar. Water cannot affect it either physically or chemically. Valspar not only does not turn white, but cannot. In our laboratory we have samples of Valspar on panels which have been submerged five, six and seven years.

In 1908, Valspar was put on the market and offered first to the boating world. The statements of its makers were considered radical, to say the least, as they were contrary to accepted varnish practice.

Valentine & Company guaranteed that when properly applied, Valspar would not turn white! It was generally accepted that varnish could not be made which would not whiten sooner or later if exposed to the action of water. Yet Valentine & Company, who were known all over the world for coach varnishes of highest quality, made this startling statement! Shortly after, to drive it home, a reward of $1000 was offered to any one who could show that Valspar turned white—and it is hardly necessary to say that it has never been collected.

The second revolutionary statement regarding Valspar was that it dried free from dust in two hours, and hard in 24 and yet possessed durability greatly exceeding that of much slower drying varnishes. Up to that time the length of time a varnish took to dry was considered a fair criterion of its durability. A varnish which dried quickly lacked durability; the longer the varnish took to dry, the greater the durability expected of it.

So those familiar with varnish naturally found it hard to believe that Valspar, which dried dust free in two hours and hard overnight, could be a durable varnish. But by trial Valspar soon proved the statements made for it, and today it is almost universally used in finishing fine yachts, speed boats, steamships, in fact everything that gets wet.

A visit to the chemical laboratory of Valentine & Company soon convinces the visitor of the remarkable qualities of Valspar varnish. In the first place, a rigid inspection is made of all raw materials coming into the plant. Then after the materials have been properly prepared for manufacture, a record is kept of those used in making every lot of Valspar. Besides this, the finished Valspar is carefully tested against standard samples—both chemically and physically. Each can has stamped on it the lot number, which by means of a card index enables the makers to determine just what lots of raw materials were used in making the particular tank of Valspar from which any given can is filled.

The result of this system is that the product is absolutely uniform in quality. No Valspar leaves the factory until tests prove it up to standard in every way.

In the physical laboratory, an expert finisher flows a sample of each new lot of Valspar on one-half of a panel; on the other half an accepted standard lot is used. The flowing qualities, drying time, hardening, brilliancy, etc., are carefully compared and the varnish is not passed unless it equals the standard.

In the chemical laboratory, a series of tests demonstrated the remarkable qualities of this varnish. First the chemist took a wood panel—finished with Valspar—and poured on it concentrated ammonia; on another spot, concentrated hydrochloric acid. Neither the strong alkali nor the strong acid affected the Valspar in any way.

Perhaps the most startling demonstration was made with a thin sheet of Valspar. The chemist explained that the sheet was prepared by Valsparring a solid substance, which is soluble in water, with three coats of Valspar. The substance was then dissolved leaving a thin sheet of Valspar .003" thick. This Valspar sheet was placed in an iron ring. After pushing down the middle of it the depression was filled with water, and a bunsen burner set beneath it, the flame striking the bottom of the Valspar sheet. Soon the water began to boil! If fresh water is added to take the place of the loss due to evaporation, this experiment can be continued all day without affecting the Valspar in any way.

Why Did the Tortoise Beat the Hare?

Advantages of the Slow Turning Motor Installed in Cruiser and Work Boat Are Pointed Out by One Intimately Acquainted With the Type

By Leonard B. Brown,

Standard Motor Construction Co.

CERTAINLY at no time in our history has the near future promised so much. At no time has the world seemed to have a sounder vision. All big business men unquestionably see great industrial activity close aboard.

At no time in the writer's remembrance have there been so many indications that buyers have a keener sense of proportions.

In our own little sphere of motor boating, the Standard Motor Construction Co. has always stood for what it has believed to be the sane, economic thing. It has always specialized on the heavy duty, comparatively slow speed engine to most efficiently and economically drive the fairly heavy, substantial boat.

At no time so much as now, have we been asked to quote on an engine to give a so-called 20, 25 or 30 mile boat a reasonable cruising speed. This does not mean that there is no place for 20, 25, or 30 mile boats. It means that the substantial boat has certain speed limitations in which higher speeds are a fallacy.

There is apparently a better understanding amongst boatmen of the basic principles of motor boat propulsion. The fact is that every boat has a certain economic cruising speed beyond which one can't reasonably expect any satisfactory results.

Probably the vast majority do not fully understand just why the above is a fact, but they have repeatedly seen an engine put in a hull with a comparatively large, slow turning propeller drive that hull noticeably faster than the original engine drove her with a smaller, faster turning propeller. The slower turning installation may be considerably less horsepower than the higher turning installation, in which case the difference in the speed of the boat unquestionably is largely due to the difference in efficiency of drive.

The drive wheel of the automobile works on solid ground. The drive wheel of a motor boat works in a liquid. It is like a wood screw turning in water instead of in wood.

It does seem remarkable that every one does not at once grasp the basic principle of propeller drive and so escape the harassing disappointments which so many boat owners experience. He cannot have complete satisfaction and enjoyment until he has an engine swinging a propeller of such design and at such rotative speed as to drive his boat forward each revolution of the propeller as near as possible to the distance the propeller wheel would travel ahead each revolution were it turning in a solid, without slip.

The very light speed boat designed and built for high speed alone with such fine lines and small displacement as to give little resistance in the water can travel ahead in proportion to the travel ahead of a small, high pitch, high turning propeller. The full bodied, generous displacement cruiser offers far greater resistance in the water and cannot be made to travel ahead in proportion to the distance that a small high pitch, high turning propeller must travel ahead, the result being a tremendous waste of power through excessive slippage.

The cruising boat must have a larger, lower pitch, lower turning propeller, if any reasonable percentage of power generated in the engine is to be converted to work done by the boat.

Because the vast majority of motor boats will always be the fairly substantial cruiser and the work boat, it is most fortunate that in designing and building the engine from the foundation of low rotative speed, it is possible to get a design and construction which is most lasting and economical in operation and maintenance, with such large factors of safety to insure against rapid wear and break-downs. It is fortunate that these principles are better understood today than ever before, for it means more universal enjoyment, more ardent, confirmed boat men.

Who has not noticed in 1921 the number of good substantial cruisers afloat, and especially small cruisers manned by the owner and his family?

A 12-Foot Channel From Boston to Miami

In the Development of Inland Waterways Lies the Success of Real Development of the Industry—A Plea for All Hands to Get Together for the Common Good

By R. Wastcost,
Paragon Gear Works

THE marine industry today, in common with all others, is suffering from the after-effects of the war. In addition to the unsettlement of business that is prevalent at the present time, there is a disturbing element in the dumping of aeroplane motors onto the market at less than junk prices. Also concerns new to the marine industry are looking toward the marine field as a possible easy outlet for goods of their manufacture. The automobile manufacturer who builds motors in thousand lots and dreams today of disposing of his surplus to the marine trade will be miserably disappointed at the lack of appreciation of the bargains that he is offering to the trade.

World conditions are different today from what they ever have been before and they will be different in the future from what they have been in the past. This statement includes foreign conditions as well as domestic.

While the disturbing elements will eventually disappear and leave the field clear for the legitimate manufacturers of products for the marine field, it now seems as if the time were ripe for the legitimate manufacturers to lay the foundation for extending their efforts in a broad way for constructive work. The various manufacturers have previously continued the even tenor of their way, undisturbed by a general survey of the whole field, content to make and sell their various products, independent of each other, each developing his own market and demand for his product with his own individual efforts. The marine industry is not a big volume business. The real foundation is laid by slow, sure, continuous growth, answering a legitimate demand. This demand can be developed and broadened by the industry itself, not working as individuals but through co-operative effort.

Now let us glance over the field for a moment. The marine industry may be divided into two branches—pleasure and commercial. We hear the most about the pleasure end—the motor boat in the summertime, by the shore and on the lake. This branch, strictly speaking, is a seasonal business, with the high peak in the spring or early summer, and the fall or winter with very little doing.

While we hear very little about the commercial end, a very large proportion is devoted to commercial work, and the demand is more or less steady throughout the year. The tendency today in all manufacturing is to straighten out the hills and hollows in order to make a steady demand. It is evident that the more we can increase the commercial or steady demand, the better off will be the industry. Isn't it time that we paid more attention to this commercial branch and its development? Where are the possibilities of development?

We hear today about the tremendous freight charges that are in force, how they are stifling business, and the hue and cry is for the cheaper transportation of goods.

Business is the exchange of commodities and in order to exchange commodities, they must be moved to the various points of demand. The development of any country travels hand in hand with its commerce. The cheaper the cost of transportation, the more rapid the development and the more business.

We sit idly by and cry out against the charges for transportation, yet the whole Atlantic and Southern seaboards are indented with harbors and rivers running far into the interior, which are neglected and not used. Every river should be used for the transportation of commodities, and yet today, practically none of these rivers are bearing any volume of commerce. It is admitted by everyone that water-borne commerce is the cheapest transportation in the world.

We have the means and yet we do not make use of them.

Possibly the development of water-borne commerce has been impeded by the shortsighted policy of the railroad systems in the past, yet we are told that 20% increase in the normal business of the country will swamp the railroads. What a relief it would have been during the last war if the rivers and inland water systems had been available for the transportation of raw material.

In 1907 there gathered together in Philadelphia a group of men from the various states along the Atlantic seaboard and formed what is known as the Atlantic Deeper Waterways Association. This association has held a convention each year in the various cities along the Atlantic Coast from Miami, Florida, to Portland, Maine. These conventions have been addressed by some of the most influential men in the country. They have preached the gospel of water-borne commerce and the improvement of our waterways. Some work has been accomplished but there is a tremendous amount yet to be done. There is a natural inside waterway very nearly all the way from the tip end of Florida to Massachusetts Bay.

With a continuous channel of 12 feet in depth protected from the storms of the ocean all the way from Miami, Fla., to Boston, Mass., what a chance for development there would be in the marine industry.

In addition to the protected channel, a glance at the map would show how many rivers there are that would act as feeders. Look at the Mississippi and all its branches, all of which should be doing their part in the transportation work of this country. A slight investigation on the part of anyone, together with a perusal of the proceedings of these different conventions that have been held, will reveal the wonderful possibilities of development along this line. Yet how many men in the marine industry have ever given any time or effort to further these proposed projects?

It would seem, as has been mentioned before, that the time is ripe for a broader outlook by the substantial men who are in the marine industry, and the development possible of the waterway systems of this country means more boats, more engines and more business. Not only would it mean more business, but what is more important would be the tremendous cut in transportation costs which would benefit everyone of these 100,000,000 people.

The cost of one of the latest type battleships will go a long way toward bringing to realization the development of this whole project.

We have the National Association of Boat & Engine Manufacturers. This association primarily has for its job running a motor boat show. The solid and substantial development of this industry depends on more than just running a show for pleasure craft only. We have the foundation in this association which could be enlarged to include every man interested in the development of the marine industry and have as one of its ideals the development of the waterway systems of this country.

Let's get together and broaden the scope of this association for more constructive work for the benefit of all.

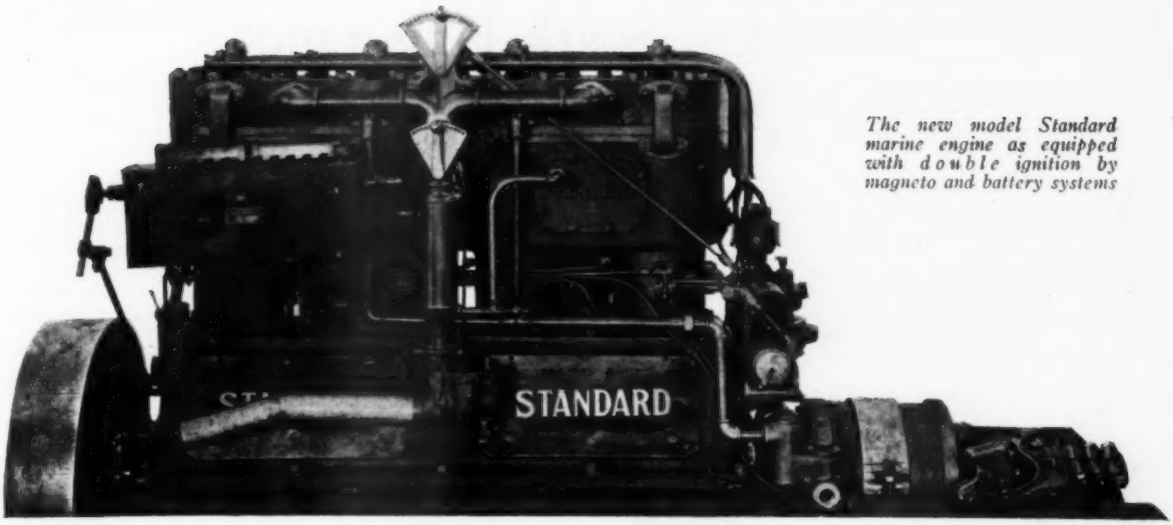
A Big Cruiser at a Small Price

(*Continued from page 29*)

The cabin interior is roomy and well arranged. A fresh water tank to provide running water at the galley sink is located far forward. The toilet compartment comes next in which is located a Victor toilet made by Loughlin Brothers, Portland, Maine. On the cabin side of the bulkhead which separates this from the cabin are clothes hooks, an important necessity. In the main cabin are berths with soft comfortable cushions and backs. Berths are 6-feet 6-inches long and will accommodate anyone. Ventilation of the cabin is accomplished by means of the ports, and hatch forward. This can be easily opened and the anchor line attended from inside the boat in case of bad weather. The galley is at the after end of the cabin. In it are cupboards, lockers, a white enamel sink with running water and a Prentiss Wabers Kamp Kook gasoline stove. In line with policy that the accessories furnished must be of the same high quality as the boat itself, the high repute of these articles speaks for itself.

The cockpit is covered by a khaki canvas awning on galvanized stanchions and is roomy. The motor is under a box and close to the steersman's position with controls carried right handy. Ample space is available for additional chairs if required. A sizable gasoline tank of 37 gallons capacity will operate the Kermath motor for at least 20 to 25 hours. A Columbian Bronze Propeller and shaft serve to do their share of the work. As mentioned the boat is equipped complete, ready to sail. Included in the sundries can be mentioned the compass, stove, foghorn, bell, running lights, line, anchor, toilet, two flags, and two copies of the Pilot Rules.

One man can control and sail this boat anywhere without difficulty. It can be readily sailed away from the plant in the Delaware River under its own power.



The new model Standard marine engine as equipped with double ignition by magneto and battery systems

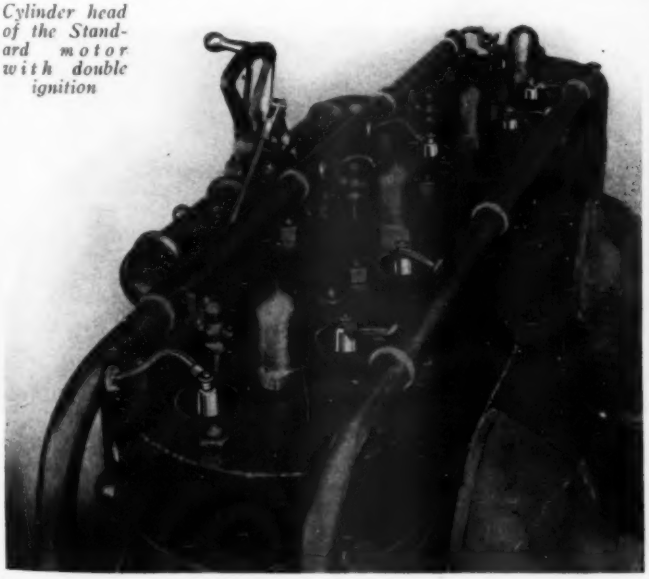
Standard Double High Tension Ignition

The Development of High Tension Ignition Has Brought Forth a Double High Tension System for Standard Motors

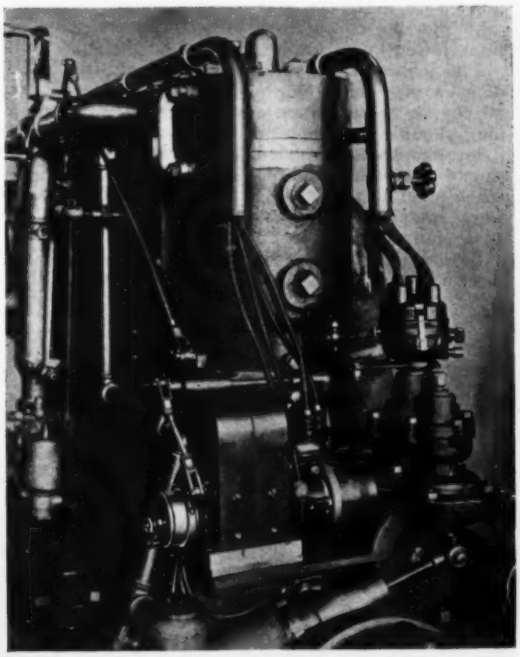
STANDARD engines, as built by the Standard Motor Construction Co., are now regularly equipped with double high tension ignition system or with the double low tension ignition system. This is entirely optional with the buyer of a new engine. The owner of an old Standard engine can, if he desires, quite easily change from low tension to this high tension ignition. The cost of parts for changing an old engine to the double high tension ignition is small.

As two separate sets of spark plugs are used in this double ignition system, a new cylinder head is required for the old engine. It is only with two entirely separate and independent electrical circuits that absolute dependability can be had. The Standard high tension ignition consists of high tension magneto with impulse coupling, magneto distributor and independent wiring and independent plugs for each engine cylinder. Also battery timer distributor and coil and independent battery wiring and independent plugs for each engine cylinder. With this equipment, the engine can be started and run on the battery circuit alone, so that all of the parts of the one circuit can be removed and the engine run on the other circuit.

With this double ignition system there is always a reserve circuit and the engine may be run with both circuits firing and very high efficiency had. The spark is advanced and retarded from the one spark advance lever on the engine. Magneto and distributers and drives are all neatly installed on one bracket on aft end of engine intermediate base. All of the component parts of both circuits are the simplest known and of the sturdiest construction.



Cylinder head of the Standard motor with double ignition



High tension magneto with impulse coupling and the battery distributor

An Ideal Spark Plug Line

Four New Types of Spark Plugs Made by the American Bosch Magneto Corporation Rounds Out Their Line and Meets All Requirements

AN especially interesting manufacturing and marketing policy will govern the production and sale of Bosch Spark Plugs during 1922. Not only because it includes a price reduction and the bringing out of new types, but because the policy itself is based upon the expressed opinions of the prominent automotive jobbers of the country.

During the past summer the American Bosch Magneto Corporation, makers of the American Bosch Spark Plug, conducted a careful and thorough investigation to determine just what constituted an ideal spark plug assortment, and what rules should be followed in its sale and distribution. The method adopted as a result of this investigation, was accomplished by means of questionnaire letters, sent out to the jobbers and dealers in which they were asked to give their opinions. In conjunction with this the corporation's field representatives personally interviewed many leading jobbers on the same subject.

The extra long 7/8-inch large hex. American Bosch spark plug consists of three parts, a heavy central electrode, a large insulator, and a strong steel shell.

The 7/8-inch standard S.A.E. hex. built to eliminate threaded joints and prevent leakage of compression

The jobbers were asked to state what sizes and types of plugs a manufacturer should produce to cover practically all engine requirements, what the retail price of a quality plug should be, what sales helps and what type of advertising should be provided, and what percentages of profit should be allowed to the jobber and dealer on a quality spark plug. The answer to these and many other questions were compiled and thoroughly analyzed, then the Bosch 1922 plans were made.

Before the questionnaire was sent out there were only three types of Bosch Spark Plugs, but it was the opinion of most of those questioned that seven types were needed to meet the requirements of practically all well known engine types. Four new types of Bosch Spark Plugs were promptly designed to conform with this opinion, and the Bosch line now consists of seven types of the following sizes: 7/8-inch standard with large hex, 7/8-inch standard with S.A.E. hex, 7/8-inch long with large hex, 7/8-inch extra long with large hex, 7/8-inch long with S.A.E. hex, 1/2-inch with pipe thread, and 18-millimeter metric.

The 18-mm. metric size plug is similar in appearance to the others and its structural features are practically identical.

The 7/8-inch long S.A.E. hex. plug is provided with nickel alloy electrodes which will withstand the most intense magneto spark.

It was decided to conform to the opinion of the jobbers and reduce the price of the Bosch Spark Plug. The plug is now being marketed at this new price.

Prior to the summer of 1921, the Bosch Company marketed its plugs through jobbers and official Bosch Distributors and Service Stations. The jobbers who answered the questionnaire urged the appointment, however, of special spark plug salesmen who would travel for the manufacturer and work directly with the jobbers and dealers. This plan has been followed and special spark plug salesmen now help jobbers in their sales work on Bosch Spark Plugs.

The Company has also increased the number and quality of its dealer helps, and more extensive advertising is being done.

Thus, the Bosch Spark Plug is being produced and sold in accordance with the best advice that could be secured from the jobbers and dealers who actually market the product. Already the plan is meeting with widespread approval, and the sale of Bosch Plugs has greatly increased in recent months.

Some interesting views of the marine motor salesroom and motor rebuilding departments of Bruns, Kimball & Co., 153-159 West 15th Street, New York, N. Y. A continuous exposition of new and rebuilt motors is on display in their show rooms. A special feature of the business which they conduct is the rebuilding of used marine engines and their resale again after they have been put into first class condition. Each motor as it comes in is subjected to a very rigid examination and any parts which are found to be faulty are replaced with new ones and the entire bearings are completely refitted. After the motors leave the shops they are good for many more years of life and useful service

Will the Industry Take Its Bitter Pill?

Buffalo Trade Doctor Writes Out a Health-Giving But Unpalatable Prescription and Wonders Whether Manufacturers and Sportsmen Have the Courage Needed to Swallow It

By C. B. McQuaig

Buffalo Gasolene Motor Co.

DID you ever hold a husky youngster on your knee with the avowed purpose of giving him a dose of castor oil?

If you have you will readily grasp the position of the motor boat industry at the present time. It has a big, choking dose of medicine to take, and it doesn't like the idea a bit. It is kicking and squirming and putting off the evil day as long as it can, but it does not alter the fact that sooner or later it must swallow its pill, or it is going to be very sick indeed.

The pill is publicity. Not the make-believe candy of self-glorification, but a big, costly, ill-tasting dose of propaganda, directed by the best brains obtainable, and aimed at the upbuilding of the sport along the lines that a score of other industries have used to gain their proper place in the public mind. It will call for many thousands of dollars lavishly spent. It will mean the united effort of every manufacturer, every boat builder, every club and every individual boat owner in the country. It will mean that men of narrow vision will have to be sat upon promptly and with force. It will mean that men of large vision must be given free scope to make their dreams come true. In short, it is a big, bitter, costly dose which no one in the industry has the slightest hankering for, but it is just as necessary as castor oil to a sick child. The only question is whether the industry has sand enough to take its pill manfully, or will it fight off and temporize until fate holds its nose?

Let's look the thing fairly in the face. The motor boat industry is sick. The trouble isn't tuberculosis or hardening of the arteries. It isn't on its deathbed by a long way. In fact, all it needs is a good shot of castor oil and proper nourishment to put it in ruddy health, but it is going to be very sick indeed unless something is done promptly.

Getting right down to concrete facts, the trouble is that the sport of motor boating has a very small place in the public mind. It is a thing apart. There is nothing to force the man on the street to ask himself seriously whether a motor boat should not have a place in his life. If he thinks of motor boating at all he thinks of it as a rich man's sport. Sometime, perhaps, he may be able to consider it, but now it is out of his reach. There is nothing to tell him that the joys of the water are already within his grasp, that for an outlay of a few hundred dollars he can have as much fun as a millionaire.

You are spending money to sell boats, engines and accessories, but what are you doing to sell the greatest sport in the world to the American people?

How is the industry to survive if nothing is done to fill the places of those who are bound to drop out every year?

What are you doing to meet the objection of the man who says a motor boat is too costly? Are you proving to him that he can get a little ship that will make his whole summer a long holiday for less than the price of a cheap automobile?

How about the one whose objection is that his wife is afraid of the water? Are you giving him any facts to convince her that the lake, the river or the sound are as safe as her downy couch compared with a state road on a Sunday afternoon?

Or the man who would buy a boat if he knew where he could keep it. Are you explaining to him where there are good boat houses available right within his reach?

These are not simply illustrations. They are actual reasons why people are not buying boats, and there are dozens more like them,

It isn't as if you had to build up a desire for a boat in the public mind. The desire is there. The only question that bothers them is how it can be attained, and you are doing nothing to answer it.

How can you expect people to buy boats when nobody tries to sell them? It is not enough to try to sell the actual boat, or the engine or the equipment which makes the boat comfortable? Before they will buy these they must be sold on the sport of motor boating in a general way. You must first sell them the desire for rippling waves in moonlight, of slowly creeping summer shadows on the river, of that whiff of salt air which wakes the Viking blood. You must contrast long reaches of placid, untroubled water with the dusty highway. You must tell them of the soul rest which can only be found in the blending of sea and sky.

In the old days the motor boat game required no brass band to bring it new converts. Recreations were not so plentiful as now. People were looking around for something to do, and the chances were that sooner or later their eyes would strike the water. But the coming of the cheap automobile changed all that, and if the motor boat sport is to hold its proper place it must shout its wares.

The idea of a general campaign of propaganda is not new. More than once some far-seeing manufacturer has suggested it and the subject has come up for serious consideration. Attempts toward the desired end have even been made on a small scale, but it has always been like the child opening its mouth for the spoon, then kicking and temporizing again.

Halfway measures will do no good. There is a big, choking, costly dose of medicine for the motor boat industry to swallow, and it might as well be good about it.

The Tax Question

An Unnecessary Lack of Employment and a Lowering of Production Standards Are the Results of the Present Tax Law

By E. F. Tomlinson

J. M. Densmore Co.

IT is generally admitted that the greatest drawback to the recuperation of the boat building business is the exorbitant tax assessed against the sale of new boats.

The ten per cent additional to the builder's price is a considerable item and one which has often determined a prospective owner to purchase an old boat which came within gunshot of satisfying his requirements rather than to build a new boat such as he really wished. It is something for which he receives no return and is too large an item to be ignored.

The proposed and defeated attempts, to scale the tax to five per cent, while moves to ameliorate conditions, do not strike at the heart of the matter.

A tax which is applied against new boats ALONE is unjustly discriminating and will always retard the progress and development of the business of boat building. The present tax stamps out all tendency to improved conditions in one of the oldest and most necessary professions we have; any smaller but similar tax will be harmful.

To the skill of the mechanics engaged in our work and of the boatmen trained in our products the navy was in no small part indebted during the world war.

A continuance of the present method of taxation will result in two things. First—Unnecessary lack of employment among our men. Second—A lowering of the standard of production in order to overcome the price handicap in favor of tax-free used boats.

A tax law can be framed that will be just and equitable and one that can meet with the approval of everyone connected with the boat business and which will deliver needed revenue to the government.

A tax levied against the transfer of all boats, both new and old, large enough to be documented would be small, easily collected and would not work a hardship upon the trade. The tax could be paid in stamps affixed to the transfer papers in a similar manner to that in which revenue stamps are now affixed to real estate deeds and mortgages and notes.

The ten per cent tax in 1920 provided revenue to the government amounting to approximately $250,000.

A one per cent tax on all transfers of documented boats, not commercial, would have provided a sum certainly in excess of this and its imposition would have caused no such interference with the normal course of our business as has the present tax. Such a tax would likewise be no burden on the prospective owner of small means.

This suggestion is offered in the hope that a discussion may be started within the trade to the end that some method of taxation can be proposed which will receive the backing of the industry as a whole. Put forward at Washington with the weight of a countrywide opinion behind it the probability of success would be high.

Let Your Conscience Be Your Guide

Some of the Relative Advantages of the Reversible Propeller and the Accepted Type of Reverse Gear

By E. J. Marin,
President of Marine Wheel Co.

BEING an Umpire has its tribulations; on the other hand it's a lot of fun to be the boss and having been the referee, or umpire, so frequently in the past one more chance won't hurt us.

We have been called upon to settle many arguments, some of them very peculiar in their nature. The latest is: Why is a Reverse Gear and When is a Reversible Propeller?

From our own knowledge, which dates back fourteen years in this particular case, we have been unable to produce a reasonable answer to the question. Each has its staunch friends among boat owners and each has its enemies. To count noses would probably be the most satisfactory method of reaching a decision.

As a manufacturer of both Reverse Gears and Reversible Propellers for a period of sixteen years, our company has answered a great many inquiries on the subject and expects to answer many more. Each article has a distinct field in which it is supreme and the prospective user should determine to which class he belongs.

In our own experience many interesting details have come to light relative to these usages. To enumerate them would be prohibitive from the space standpoint and tedious for the reader. Some of the high lights in each case may be of interest.

In developing the Reverse Gear, our old company had the requirements of certain classes in mind, one of these being large installations. It is a well known fact that very large engines can only be handled satisfactorily by means of a Reverse Gear. The disc type is usually found to be preferable on account of its taking hold easily and avoiding strain on moving parts. The Reversible Propeller is difficult to handle in sizes over 30 inches in diameter, and its manufacture has been avoided by us in preference to the gear. The future may develop conditions which will put the propeller on an equal footing in large sizes.

In places where many obstacles are encountered and the propeller is subject to a great deal of abuse, it is usually cheaper to use the Reverse Gear and replace broken or bent propellers. Very weedy waters are also unfit for Reversibles, since there is no method of throwing off the weeds as the construction does not usually lend itself to weedless qualities. In this case the Gear is handy since the shaft and propeller may be reversed and thus throw off the weeds.

The high speed engines now used in racing crafts preclude the use of the average Reversible Propeller and almost demand the use of a gear. It is also very difficult to bring the Hub dimensions down to a point where the Reversible can be seriously treated as a Speed Wheel. This does not mean they are not fast, since many are used on fast boats. Our contention is, however, that it is nevertheless not a racing propeller and must give way to the specially designed gear and solid propeller.

From the foregoing it might be imagined that the uses of the Reversible Propeller are very limited, but to the contrary it has many very valuable uses. In cases where absolute control of speed is essential and where it is undesirable to vary the engine speed it is well adapted. The pitch of the blades may be varied from zero to the maximum in any degree desired. This is highly essential in trolling and picking up nets.

It is also valuable in making landings; the modern engine may be throttled to a low speed much more safely than the old timers. but there are still many places where a stalled engine would be a serious matter. There we find the Reversible Propeller supreme. Its simplicity is in its favor and also the fact that repairs are very readily made at a minimum cost.

The Reversible Propeller is now made in many styles and each has its advocates who make certain claims for their favorite. It should be easy to operate, quiet in its action, all parts readily accessible and removable. Such parts as are subject to wear should naturally be readily secured and quickly replaced, and since a great number are used on Mail Boats, Ferries, Fish Boats, etc., it is reasonable to suppose that the service given is commensurate with the cost. This is further proven by the demand for Reversibles, which has now far exceeded the Gear inquiries.

This may be partly due to the fact that our clientele is recruited chiefly from the working boats, which must operate daily to earn a living for the owners, although a fair representation is evident in the cruiser and pleasure boat classes.

The Reversible Propeller meets with favor on Auxiliary Sailers, since it can be left in the full forward position and thereby reduce the drag when sailing with engine shut down.

The demand for this particular product has fluctuated with the development of the business. Several years ago it was standard equipment in many cases, only to be superseded by the Reverse Gear. In the last two years, however, the tide has turned, at least in our case, and the demand is all for Reversible Propellers again. Many of these propellers are in use for sixteen years and still giving satisfaction, which leads us to believe it would be hard to go far wrong in selecting a Reversible Propeller as standard equipment, with the exceptions already noted.

There are several companies who can explain their product in detail and shed additional light on the subject. If the question can not be decided from the evidence at hand it can readily be done by the toss of a coin, since it would be difficult to go far wrong in either case.

All good sales managers invariably warn the recruits not to mention price until the last and as I must follow these teachings, I too mention it at the end: Maybe the price will decide it for you and thereby save you all further worry. This is not always a good criterion but in these days it is nevertheless a powerful weapon.

Aviation Motors Will Not Do

Light Construction and Inadequate Materials of Both Airplane and Automobile Engines Render Them Incapable of Performing Marine Service

By William Bruns

THE cylinder castings on both aviation and automobile motors are very light and will not stand the hard constant operation at maximum power which is a condition which an engine in marine service is subjected to. This is particularly true of the outer walls which are very thin and will eat through in a short time when used in salt water (many of the aviation motors offered have steel cylinders and water jacket walls which are practically useless for salt water use). The writer has known cases where these steel cylinders did not run for 30 days in salt water. In addition to this a steel cylinder will score very readily and even with the best of care they are very short lived. They are also less efficient in operation on account of the added friction in comparison with the cast iron cylinder. In aviation service the saving in weight was the chief object to attain, the number of hours these cylinders operated was a secondary matter and in many cases it was less than 50 hours.

In both automobile and aviation motors the radiation is necessarily limited therefore the water jackets usually do not extend as far as the piston travels, consequently when the motor is operated at its maximum power output for any length of time the base becomes overheated thereby causing an endless amount of lubrication troubles, excessive oil consumption and unreliability. The installation of a motor in an airplane, car or tractor is such so that a very considerable amount of air cooling can be utilized which will help to eliminate the troubles mentioned above, furthermore neither an aviation or automobile motor is operated at its maximum speed and power output for any great length of time.

The lubrication system of the above mentioned motors is designed to operate with the motor setting level, however this condition is never found in a marine installation, as the motors must be installed at the shaft angle of the boats which they are to power, this angle is anywhere between two and eight degrees, consequently when a type of motor other than a strictly marine type is installed at this angle the oil works back to the after end of the base flooding this part of the motor with oil and making it impossible to properly lubricate the forward part of the motor. This will surely result in burned out bearings, scored cylinders and numerous other troubles. In the past this condition has been partially overcome by universal joints which when used to change the shaft angle are a constant source of annoyance and trouble. In addition they soon become very

noisy and their use in changing the shaft angle will result in a considerable loss of power. They are also expensive to install and maintain.

For automobile, truck or tractor service the proper and usual location of the fly-wheel is at the after-end of the motor. In marine service this is impractical as it greatly increases the shaft angle, it also makes it necessary to install the motor much higher. In the runabout it is almost impossible to install this type of motor without raising the hatches, which in many cases is very unsightly in appearance. In addition to this a small boat having the motor installed high enough to accommodate a fly-wheel at the after end of the motor is not as seaworthy as it would be if a regulation marine was installed thereby keeping the height from eight to twelve inches lower. The aviation motor is not equipped with a fly-wheel but the only available location in the after-end of the motor . Motors of the above type are also very inaccessible when installed in a boat as it is necessary to remove the motor from the boat in order to make an inspection of the main or connecting rod bearings.

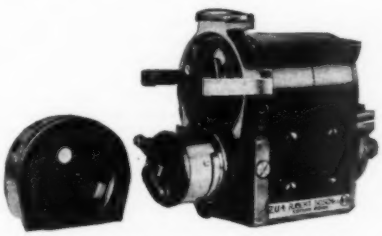
The very fact that these types of motors were designed, constructed and developed for service entirely different from marine work, makes it impossible for even an experienced marine motor manufacturer to convert these motors so that they will give satisfactory or reliable service when installed in boats. In the work of conversion we cannot change the general design. All that we can do is to equip these motors with a suitable reverse gear, water pump, electric starting and lighting system, water cooled exhaust manifold, fly-wheel, etc., but after all of this work is done, it is unsuitable for marine work. It is true that in rare cases a party with experience in handling motors and one with a disposition to nurse them along will get some service out of a motor of this type but the general user will not get satisfactory or dependable service and after spending time, money and patience, will become disgusted and will come to the decision that motor boats are a nuisance and that there are no reliable motors on the market.

Magnetos and Spark Plugs

Ignition Apparatus of High Quality for Every Form of Internal Combustion Engine Being Made by Robert Bosch in Europe

IT is again possible to secure magnetos of the original Robert Bosch brand. The original company is manufacturing magnetos of all conceivable styles and sizes in the tremendous works abroad and distributing from the central office here. An indication of the magnitude of this task can be gathered from the fact that 8,000 odd skilled workmen are producing a matter of 400 different types and styles of magnetos. In addition, the works are producing such items as electric horns and spark plugs in countless numbers.

The Robert Bosch type ZF4 high tension magneto is completely enclosed making it water and dust proof



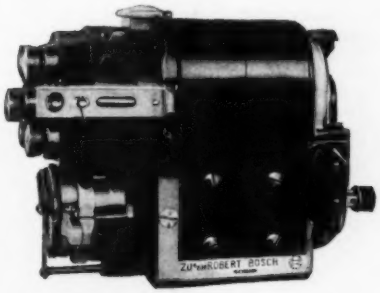
The type ZU4 magneto with distributor covered removed. Driven at crankshaft speed for 4-cylinder 4-cycle engines

The magnetos in whatever styles are all completely enclosed in dust- and water-proof housings. This alone serves to increase the efficiency of these instruments, since the action cannot be affected by dust or moisture. From the smallest instrument, intended for a little single-cylinder motor, to the monstrous 12-cylinder wonder, the same exacting requirements in design and accuracy of workmanship govern. Bronze forgings all used throughout for base and bearing housings.

Genuine Robert Bosch spark plugs are made in the two piece design to facilitate cleaning. The insulator is of a special stone called Steatite

Among the most remarkable of these machines is the two-spark type, made in four- and six-cylinder units, both independent and dual. The advantages of two-spark ignition are, that this system fires two plugs in each cylinder simultaneously, thereby producing more rapid flame propagation which gives increased power to the engine and less fuel consumption.

The magneto models are graded by style letters, according to the size of motor to which they are best suited. For example, the type ZF will suit all motors up to 3½ inches bore; the type ZU, all motors up to 4½ inches bore, and the type Z, for very large motors. On magnetos of the ZR two-spark type, designed for slow speed motors, an impulse coupling which disengages between 70 and 80 r.p.m. makes hand starting very easy. The motor can be turned slowly and a spark intensity obtained which will fire the charge under all conditions.



The type ZR4 is a two spark magneto which fires two plugs simultaneously in each cylinder

The utmost reliability is ensured, not only by the perfect insulation of all the current conducting parts inside the magneto, but also by the avoidance of any bare contacts outside the magneto, that is, between the magneto and the sparking plugs. The cables are connected to the magneto by means of insulated screw terminals, which entirely shield the metal surfaces and hold the cables secure. The enclosed construction not only gives the magneto a compact appearance and renders it noiseless, but also makes it impossible for water or dust to penetrate into the magneto.

Newest Models of Frisbie Motors

Medium Speed Heavy Duty Motors of a New Type With Enclosed Dual Valves, Hot Spot Manifold, Removable Heads and Other Modern Refinements

IN addition to the line of motors already well known to all of the readers of MoToR BoatinG the Frisbie Motor Company, of Middletown, Conn. will exhibit a new line of valve-in-head motors, known as the model T series.

This new line of motors is made in four sizes—model T-2, 2-cylinder, 20 h.p. at 600 r.p.m., model T-4, 4-cylinder, 50 h.p. at 600 r.p.m., and model T-4 special, 100 h.p. at 1,200 r. p.m. The design and construction are as far superior as were the established lines of Frisbie Valve-in-Head motors when first produced over fifteen or twenty years ago.

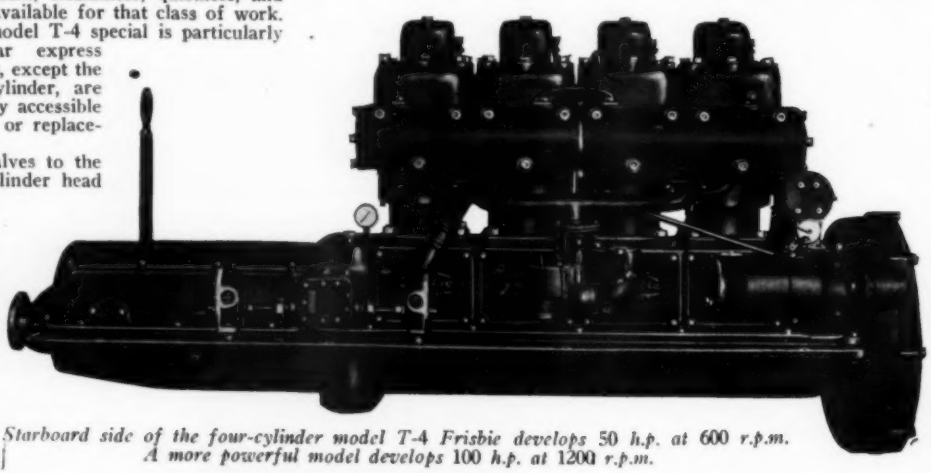
This new model offers to users of heavy boats of moderate size, commercial fishermen and sailors seeking auxiliary power and installation of refinement, cleanliness, quietness, and reliability not heretofore available for that class of work. The 4-cylinder, 100 h.p. model T-4 special is particularly adapted to the popular express cruisers. All moving parts, except the flywheel in the T-2, 2-cylinder, are entirely enclosed, yet easily accessible for inspection, adjustment or replacement.

The use of the four valves to the cylinder located in the cylinder head in accordance with Frisbie practice, permits rapid intake of fuel and quick, thorough scavenging of burnt gases. As each individual valve can be made smaller, they are quieter in operation and less apt to warp or break. The valve springs, too, have less tension which reduces the noise. Yet this construction calls for no more actuating mechanism than does that of a motor with two valves to the cylinder. One rocker arm operates both intake valves and another operates both exhaust valves. Both valves are synchronized as to time of opening and closing by an equalizer on the end of each rocker arm.

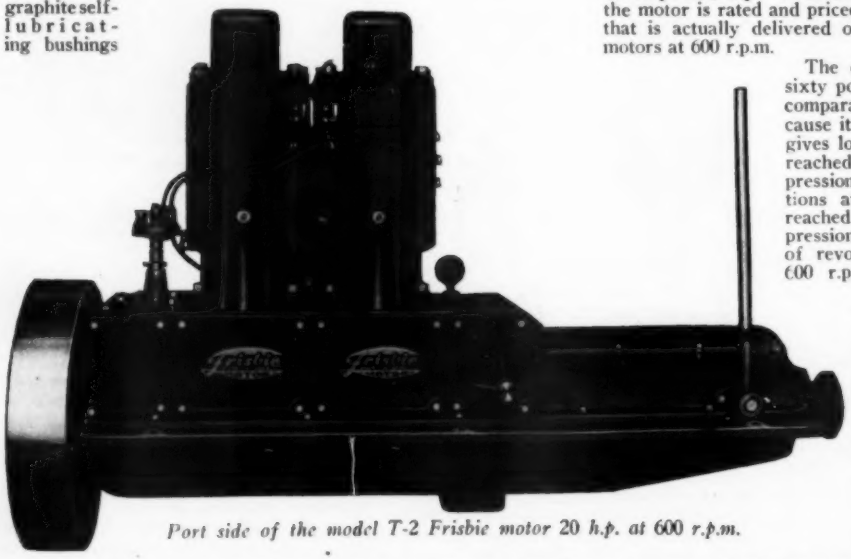
The lubrication of the rocker arm is made unusually effective by the use of graphite self-lubricating bushings where they work on the rocker arm shaft and also where the equalizer is installed. These bushings, which operate entirely without oil, do away with the complication of piping necessary to carry pressure oil to the head of the motor, and also with the need of removing the covers to lubricate the rocker arms.

Upon the proper condition of the valve and its seat the efficiency of a motor greatly depends, and the valve, to be kept in good condition, must be accessible. Heretofore valves in detachable cylinder heads have not been truly accessible. It was necessary to remove manifolds, water pipe connections, etc., before the heads could be taken off. So for this model T motor the Frisbie engineers carried the gas passages from the valve apertures within the cylinder walls and the cylinders themselves to points on the side of the cylinder lower than that at which it was necessary to break off for the head. With this design a cylinder head can be removed without dismantling the exhaust or intake manifold, or disconnecting the spark plug wires or any water pipe connection.

As might be expected with so many improvements the result is a motor that is wonderfully efficient and this model T certainly fulfills the expectations. The T-2, 2-cylinder is rated 20 h.p. at a speed of 600 r.p.m., a speed at which it can most efficiently be used in the majority of boats. At that number of revolutions tested on an electric dynamometer, the motor actually develops 23.5 h.p. With the characteristic Frisbie conservatism the motor is rated and priced as 20 h.p., but 23.5 h.p. is the power that is actually delivered on any of these 2-cylinder model T motors at 600 r.p.m.



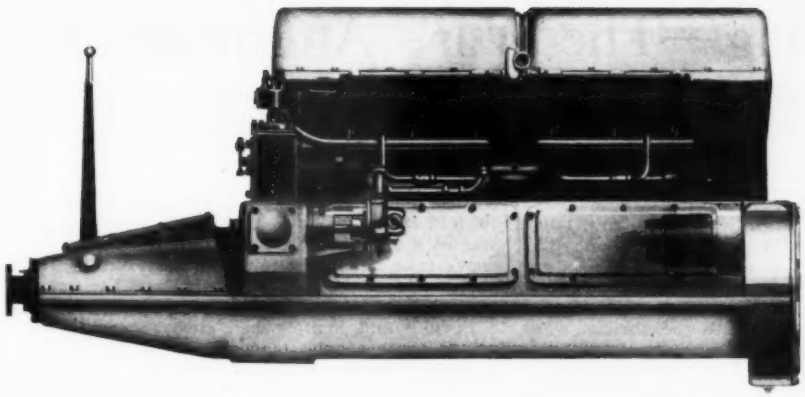
Starboard side of the four-cylinder model T-4 Frisbie develops 50 h.p. at 600 r.p.m. A more powerful model develops 100 h.p. at 1200 r.p.m.



Port side of the model T-2 Frisbie motor 20 h.p. at 600 r.p.m.

The compression in this motor is about sixty pounds to the square inch, cold. This comparatively low compression is used because it reduces the high pressure areas and gives long life to the motor. The efficiency reached by this 2-cylinder motor with compression at only sixty pounds and revolutions at 600 is probably better than that reached by any other motors of that compression, number of cylinder and number of revolutions. When pulling 23.5 h.p. at 600 r.p.m. on the dynamometer test, this engine actually uses in gasoline of standard market quality, .57 to .58 pounds per h.p. hour. These are more than laboratory figures; one engine that was installed in a 28-foot boat ran twenty-seven minutes on one gallon of gasoline at 595 r.p.m. As proof of efficient lubrication, the same engine, in the same boat, ran thirty hours doing general fishing and towing work, on about 1.5 quarts of cylinder oil.

The use of the four valves to the cylinder, together with the perfect carburetion system referred to, affords a flexibility that has seldom, if ever, been found in any 2-cylinder, four-cycle motor. When operating in a boat at 600 r.p.m. it was found without readjusting the carburetor that this motor could be slowed down and still operate under load at revolutions as low as 125 r.p.m. and could from that slow speed be picked up again to 600 r.p.m. without faltering. The lubrication is entirely regulated by one valve and gauge.



Clean cut in every way are the new Sterling Sea Gull and Viking models shown for the first time at the New York Motor Boat Show

Sterling's Masterpiece

New Sterling Sea Gull and Viking Motor Models Are Built in Six-Cylinder Sizes, Practically Identical and Fine Examples of Advance Marine Engineering

QUITE different from their predecessors are the two new Sterling engines which appear at the Motor Boat Show. Instead of being designated by letters to indicate the model, these engines were named Sterling Sea Gull and Sterling Viking, names which were derived from the Sterling Coat of Arms and they are singularly appropriate.

The Sterling Sea Gull is 4 11/16-inch bore by 6-inch stroke, medium and high speed model, designed expressly to come within the piston, displacement limit for the Gold Challenge Cup, which has been won a great many times by Sterling engines. The rating is 150 h.p. at 1800 r.p.m. for average duty.

The Sterling Viking model, similar in design, is 7-inch by 8½-inch stroke. The smaller engine has single overhead valves and the latter dual valves in the head. These valves are operated by overhead camshafts. Since the engines follow the successful building of marine engines for 20 years, it is natural that they should partake of some differences. The Sterling Engineering Staff has been noted for many years for their development of high duty engines and they have frequently been called to Washington in consultation with Government Officials over proposed engine design for caterpillar tractors and other vehicles.

Dual valves are used in the larger model partly because of the size of the bore, and again because for bores 5 inches and over they are more efficient. The difference is not so apparent in engines below 5 inches in bore, unless turning 2,500 to 3,000 r.p.m.

An unusual feature is the water jacket for the cylinders. This is one casting the full length of the upper crankcase. It is bolted to the crankcase by concealed bolts, which are, however, accessible. Absolute rigidity of the engine is secured, preventing any possible weaving or changing of alignment of the crankshaft or bearings. The cylinders are inserted in the form of sleeves into the cylinder jacket.

In the event of wear, the cylinder barrel proper is easily taken out and replaced. These cylinder barrels are less liable to distortion, also, due to the fact that the metal thicknesses are exactly alike around the entire circumference and no longer is it necessary to contend with the shifting of the cores in the molding operation. The cylinder barrels are machined all over and sufficient cut is taken to get down into the virgin metal, eliminating all sand holes which sometimes are close to the surface. In machining these cylinders, they are carefully heat treated to take out all strain, and in grinding the cylinder walls the cylinders are held in a water jacketed fixture which keeps them cool and enables the grinding operation to be quite accurate. The detachable cylinder heads are arranged with internal water passages surrounding the valve seats and spark plug bosses to assure uniform cooling. The casting is especially treated to eliminate warping. The combustion chamber, being fully machined forms a smooth surface to which carbon does not readily adhere. The cylinder heads are cast in blocks of three and the result is a very rigid stiff engine on which it is quite possible to mount an overhead camshaft without considering the stresses and strains, or the weaving, occasioned by the use of cylinders in blocks of one or two or three. In the cylinder head, the passages are quite clear and designed to enable the rapid intake of fresh gas and quick discharge of burned exhaust gases, with increased efficiency in the combustion chamber.

The lower base is a single casting extending the full length of the engine room flywheel cover to and including the thrust bearing. There are no joints in this casting which, being the foundation of the engine, necessarily should be very rigid. The upper base is an aluminum casting with seven main bearings, all double bridged, and the maximum size hand hole plates are employed on both sides. Bearings can be taken up and replaced through these hand holes. The crankshaft is 4 inches diameter on the 7-inch bore Sterling Viking model and 2⅝ inches diameter on the 4 11/18-inch bore Sterling Sea Gull. It is machine finished and balanced and drilled for pressure oiling system to all main and connecting rod bearings. The flywheel is attached by a flange.

The connecting rods are forged of chrome nickel steel and heat treated; are tubular in form bored out, or hollowed, and provided with an oil tube to the wrist pin.

The pistons are an especial aluminum alloy type which have been used for about three years in other models. On one occasion, engines with these pistons operated for 52 days averaging up to 12 hours a day at 1400 revolutions a minute. Another notable run was with an eight-cylinder engine which operated 9 days constantly at 1200 revolutions. These engines performed duty perfectly showing practically no wear on pistons or cylinder walls. The aluminum pistons reduce the load on the bearings by about 50% over iron. The weight of the finished connecting rod with bolts, shell bearings, and piston employed in the Sterling Sea Gull model is 5 pounds, indicating some excellent engineering. Piston pins are tubular nickel steel, carefully heat treated and ground.

The Sterling clutch is employed. It is a multiple disc clutch with the discs being enclosed in an oil tight drum supplied with pressure lubrication through the crankshaft. The discs are alternately bronze and steel, the steel discs being similar to the material employed for circular saws. Couplings are on both sides of the clutch and reverse gear so that this unit can be removed without dismantling the clutch. The clutch has been worked out to a very high stage of perfection in the past several years. The ignition is the distributor system—two spark plugs being employed in each cylinder of the smaller Sea Gull model and four spark plugs in the Sterling Viking engine, all firing being synchronized. The exhaust manifolds are fully water jacketed; the inlet manifold is internally smooth, facilitating the passage of grease, and the exhaust manifold outlet is in the center of the exhaust manifold differing radically from the usual marine practice, but assuring an easy exit of the exhaust gas and enabling the attachment of an exhaust line with long bends and without angles; also a free passage of exhaust gas without back pressure.

These engines are quite symmetrical in appearance, there being a notable absence of bolts and nuts and other appendments. The designer seems to have worked with a viewpoint to appearance. It is said that the horsepower greatly exceeds the rating and that the engines develop as much horsepower as has ever been attained in an engine of comparative bore and stroke. The compression is relatively low for high powered engines being but 70 pounds for normal duty.

Outing—The War's Aftermath

Benefits to the Public Mind and Body as a Result of the Increasing Desire to Spend Spare Time Out Doors

By T. A. Taylor

WHEN your young grandson asks for a story of wonders you, of course, begin with Once On a Time. It is now about as regular to begin our new reckoning from After The War.

As a manufacturer of an article used in out-door life it has been an interesting study to watch the developing of the idea in the Public Mind turning to the various ways of spending its time out doors.

Foreign countries all turn to out doors for their recreation more than we do. South American countries, I am informed, have something like 180 holidays, and the greater part of these is given over to sports. The idea of the Great American Public taking all of a sudden to the out-doors seemed to have its foundation then in some great underlying cause. Even our Canadian friends give up more of their business time to vacation than we do. Many merchants I can recall in Canada thought they could not get through the year as one should, unless it contained a trip to England.

That same kind of a merchant in this country made it an event for himself, and the family were set into a commotion when Dad made his annual trip of not over a three-day duration to visit his market city, possibly not over two hundred and fifty miles away. Jim Hill saw that the people should give more attention to this side and you recall the mountain goat that rides the side of the Great Northern box cars encircled with the suggestion to See America First.

Now, the Public is just awakening to seeing America and using every means of doing this that can be suggested by speed and comfort. It is not all on land, or for that matter, the water, either, but the air is called upon to contribute its share.

The last two years have shown that the American Public has awakened to the necessity of taking a trip.

It goes at it in its customary way with an impetus that is just what you would expect.

The occasional trip to some lake or seaside for a few days where all stay on dress parade with the whole act such a job of labor that we are constrained to agree with the old lady who said, "She was so glad to get home she was glad she went," has been enlarged upon.

We take a tent and camp, and stay weeks, or tour along shores undiscovered before by us and live in a garb much like the original Indian who once owned the banks.

Fishing and hunting had always been the solitary and selfish sport of one member of the family until the son grew big enough to join, but now the whole family go.

What has brought this change? It is the second crop harvested from the War. Something like four and a half million men were taken from home and placed into camp life, and from this on ocean voyages of discovery which to most of them were as novel as to Columbus himself, and as much of a venture.

These men regardless of discomforts learned first-hand the beauties and fascination of the Great Out Doors.

No academic process known could have possibly in a few short years convinced so vast a number as did the forced reality of the thing itself. It awakened latent longings for either land or sea travel and contact.

And it has swept the recipient and his immediate associates off their feet in the desire to realize the yearning to get out and away and near to the thing desired. Long tours in automobile, revival of motor boating and larger craft, long vacations in camps in localities to suit each one's own desire has been the result. It has only just begun to bear fruit, for the succeeding years will show a most wonderful advancement in all these outings. The means of conveyance and the methods will undergo vast changes from the appliances now in use and much will be discarded and greatly reduced.

But the benefits to the public mind and body will keep increasing, giving it cleaner living and clearer thinking to its great and lasting good.

Regrettable as the war was, and still is to many, it has given to the people of this country such a legacy of wealth in healthful desires as to make them almost thankful that it happened.

Making An Old Boat Permanently Watertight

(*Continued from page 22*)

yet smooth surface. Furthermore, there is a remarkable degree of added stiffness to the hull, and after it is painted and ready for service the only evidence of the waterproofing is the absolute lack of ability to leak.

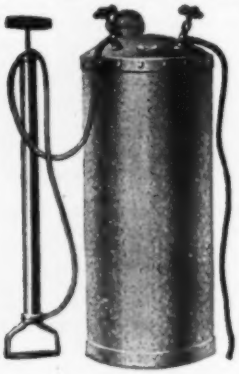
The wise ones have long ago learned that to waterproof any boat with the right sort of marine glue on which has been laid heavy unbleached cotton cloth takes less time and costs less than to overhaul, recalk, repaint, etc., a boat that needs attention.

This waterproofing has only to be done once in a lifetime. Over and over again it has proved its ability to double the life of a boat. It stiffens the hull from 15 to 33 1/3 per cent and the final weight is less than if the same hull were allowed to swell up and soak water.

The engine may vibrate from the beginning of the day to the end, day after day, without opening up a seam—for the very simple reason that there are no longer any seams to open.

One man, writing of the remarkable service of his boat which was treated with this process nearly a quarter of a century earlier, says, "Has been pulled on beaches, run over rocks—for twenty-four long seasons. Has she leaked? Not a single drop. Her surface under water is so hard I could not get a rip in the cloth when I tried."

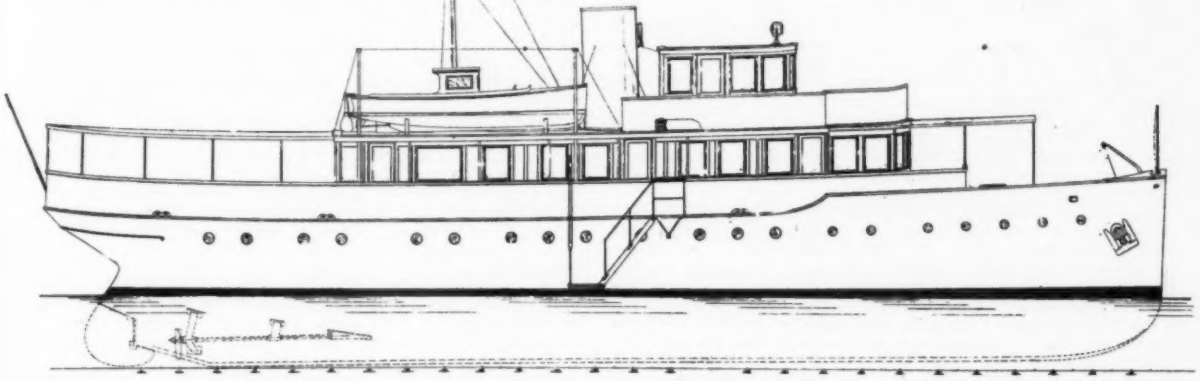
That is the story of what the proper use of the right marine glue will do for any small craft. The shrewd ones will profit by this information while the others will start another season with hulls that will probably leak a bit more next year than they did last year and will continue to get worse until abandoned as unfit for further service years before they would reach a ripe old age if given this treatment before the start of the coming season.



The small size and the large Kamp Kook stove made by the Prentiss Wabers Co. and particularly adapted to boat service

Caritas, An Able Steel Yacht

Designs Prepared and Construction Well Under Way on 98-Foot Winton Gas oline Driven Sea Going Yacht



Outboard profile of new 98-foot Diesel Yacht

AMONG the good-sized yachts which will make their first appearance next Spring is a wholesome, steel, twin screw power yacht under construction for Joseph Percy Bartram, N. Y. Y. C., from designs by and under the supervision of Cox & Stevens of New York. Herewith preliminary profile and accommodation plan are shown of this vessel.

The progress on this new yacht is well advanced. Her principal dimensions are: Length overall, 98-feet; Beam, 20 feet; Draft, 6 feet. The Construction will be unusually heavy. Deckhouse, pilot house, and all exterior brightwork will be of teakwood.

The power plant will consist of a pair of 125 h.p. six cylinder Winton gasoline motors which will drive the vessel comfortably at twelve statute miles per hour. An independent Winton generating set, 110 volt electric lighting system, hot water heating plant, up-to-date ventilating system, and all conveniences will be embodied in the vessel. Unusually ample fuel and water capacity has been provided.

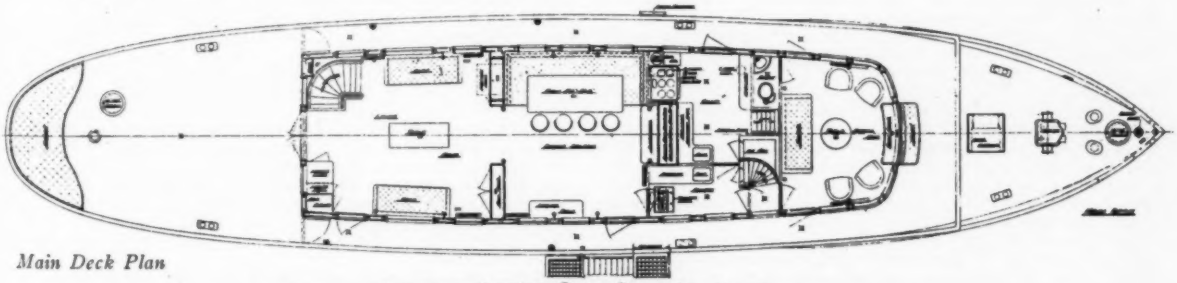
A remarkable feature of this new yacht is the amount of accommodation afforded the owner without crowding the engine room, galley, or crew quarters.

The large owner's quarters on deck comprise a smoking room forward, about ten feet in length, following which are the galley and pantry; next aft is the dining saloon, twelve feet in length, accessible through folding doors from the adjoining living room which is about sixteen feet in length; the unbroken after deck is twenty-five feet in length. The pilot house will contain steering column, chart room, etc., and is accessible by stairway from main deck on starboard side. The smoking room, dining saloon, and living room will be handsomely finished in satin walnut.

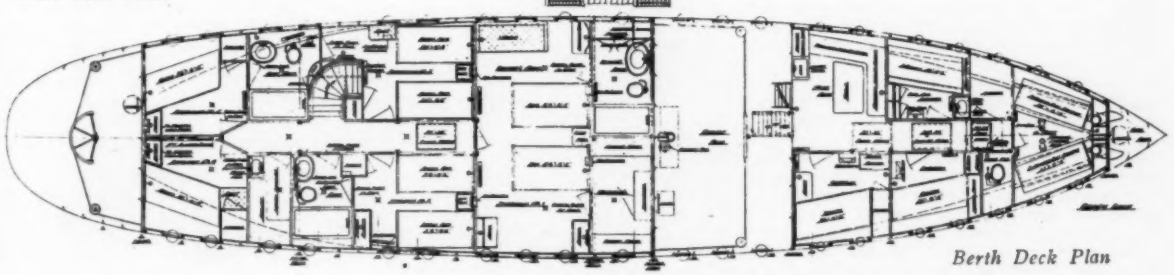
Accessible by a stairway from the living room on port side are the staterooms; the owner's stateroom is the full width of the boat, containing two beds, sofa, bureau, desk, etc.; directly forward of it is a large bathroom to port and wardrobe or dressing room on starboard side. On either side of the passageway leading from the owner's stateroom are two guest's rooms, each fitted with two beds, and bathroom on either side; furthest aft is a stateroom with a built-in berth on either side and which by means of sliding doors can be converted into one double or two single rooms.

The craft will be attractively furnished and fully equipped when leaving the builders' yard. Her small boats will comprise a 21-ft. starboard launch with shelter cabin, and a 16-ft. port launch.

This new yacht should be unusually able. Her accommodation is greater than the average houseboat of her length, and she will have all the advantages of a houseboat as regards living space and better seaworthy qualities.



Main Deck Plan



Berth Deck Plan

Pick a Motor That Will Serve You

(*Continued from page* 30)

self-contained unit, fully equipped with moving parts enclosed. All accessories such as reverse gear, starter, generator, magneto, bilge pump, etc., should be built-in features and not attached as an afterthought after assembly.

Ask any motor boat owner how many grease cups there are on his engine and the chances are that he cannot tell you. A repair bill has been a costly reminder to more than one owner who did not think of grease cups until the motor began to balk because of lack of lubrication. Grease cups are a menace to the service life of the marine engine, for it is easier to neglect them than it is to give them the necessary attention. One of the most popular lubricating systems is one where the oil is not only forced under pressure to the bearings, but clear through to the reverse gear and thrust bearing, rocker arm shaft, and even to the interior of the reverse gear itself.

Half of the enjoyment a real dyed-in-the-wool motor boat enthusiast gets from his boat is the puttering around that goes with it. Of course, there are certain jobs that he cannot do, but there are others he can and will do if his motor permits quick access to the parts that need attention. Accessibility should therefore be the key-note of marine motor design. Provision must be made for repairs and adjustments with the least trouble and labor. Most owners will operate and care for their motors themselves by choice and they are the ones who will appreciate extreme accessibility in the marine engine.

The cooling system has a great deal to do with the efficient operation of a marine engine. An overheated engine cannot do justice to its job and for this reason the cylinder castings should have hand holes for cleaning at the water jacket. On the other hand, the great majority of marine engines operate at too low a temperature. To overcome this objection the engines of later design carry the water around the exhaust manifold before sending it into the water jackets. This practice also cools the exhaust manifold. Provision should also be made in the design so that the operator in Northern waters may obtain the same efficient operation of his motor as the man in the warmer waters of the South. This can be accomplished very nicely by equipping the engine with a pump of sufficient capacity to take care of the cooling in the warm waters and then installing a regulating valve in the water line which allows a certain percentage of water to pass directly overboard after it has passed around the exhaust manifold.

The crankcase should be fitted with large hand holes making the crankshaft and camshaft bearings instantly accessible. This applies also to the reverse gear housing which should be constructed so that when the cover is removed the entire gear is available for adjustment or repairs with the least amount of trouble or inconvenience.

Pitted valves are a source of trouble and annoyance to any boat owner. They reduce power and lessen speed, and the grinding operation is with most motors a tiresome and costly undertaking. The valves should be so designed and located that they are readily accessible, thus reducing the work of grinding to the minimum. Arrangements should be made for adjusting valves from the top of the motor as this is the most accessible part in most installations. Anyone who has experienced the back-breaking and knee punishment which accompanies this operation in the majority of motors will appreciate this point.

Not every boat owner wants an engine that includes the starting motor and generator as standard equipment. An allowance should be made for this equipment when not taken. In other words, the engine should be priced both with and without electrical equipment. Thought should be given to this point when the engine is first designed, and the crankcase should be so machined that the user can add this equipment at any time he desires at a reasonable cost and with the least amount of annoyance. Standard dimensioned units should be used, making it possible to secure service on electrical apparatus at the accessory manufacturer's many service stations located throughout the country.

If you are building a new boat or putting a new engine in your present boat take advantage of recent progress in engine design. Don't buy a motor of old construction or out of date design. Consider carefully the newest and the latest motors that have been thoroughly tested under actual service conditions and have proven their quality. Before you definitely decide on your motor try this simple test. Take a piece of paper and write in parallel columns just exactly what you get with the various engines. Compare the design, material, construction; also crankshaft and bearing sizes. List the equipment that is actually included in the price of each engine. In this manner only can you intelligently make your choice, for the joy that the tempting price of a cheap article gives will quickly be forgotten amid the grief of its disappointing service.

The St. Lawrence Skiff Comes Back

WHEN the A. G. Spalding St. Lawrence Boat Company was established in 1894 the town of Ogdensburg, N. Y., went on the map as the home of fine skiffs and canoes. The old Spalding factory is still in existence, and now after a lapse of several years, the St. Lawrence skiff which originated there and which has long been famed for its trimness, staunchness, and ease of handling, is again in production.

The concern responsible for the rehabilitation of the St. Lawrence skiff is the St. Lawrence Boat Works,. Inc., consisting of a group of men who are anxious to set a new mark in the manufacture of fine boats and canoes. Many of the carpenters and mechanics whose skillful labor contributed to the excellence of the earlier models are putting their years of experience into the production of the new craft, and Joe Leyare, who has the reputation of being a boat-builder to the very finger tips, is superintending their workmanship.

Oldtime boatmen need no introduction to the fine lines of this skiff, nor to its seaworthiness and durability. They have used it on their hunting and fishing expeditions and they have seen it stand up under rough usage on lake, river, and portage. They have observed its behavior in still water and in sudden squalls and they know its inherent worth.

But oldtimers as well as the younger generation of boatmen will be interested in the details of its workmanship and materials. The St. Lawrence skiff of today is no more a manufactured product than it was in '94. All of the woodwork, except for the cutting of the rough stock, is done by hand, and there is no interchangeability of parts. The planking of each boat is individually shaped for that boat, and when it is nearing completion the thwarts and floor boards are fitted to it. The result of this individual attention is seen in the beauty and the tightness of the completed boat.

When it comes to materials, the builders aim to combine lightness with durability, and so, of course, use the woods that have proved most suitable in years of experience. The planking of the skiff is 5/16-inch white cedar, over a keel of white oak and closely spaced ribs of white oak or rock elm.

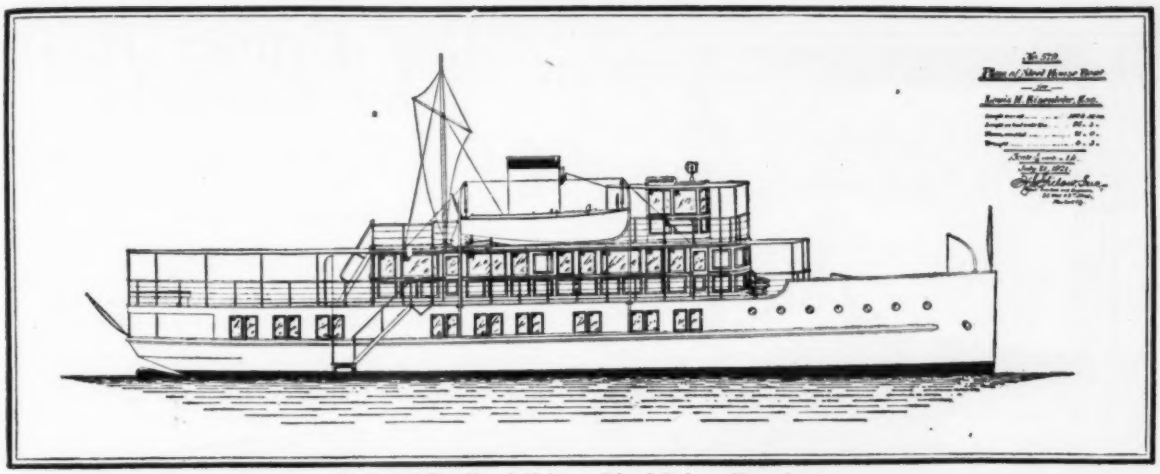
Mahogany is employed for the gunwhales, inwhales, seat risers, and decks, and mahogany edging is used for the two white cedar rowing seats. With removable floor boards of basswood and end seats of white cedar, the lists of woods entering into the composition of the model is complete. The attractive appearance of the skiff is enhanced by nickel-plated brass fittings, while fastenings of brass screws and copper nails and rivets contribute to its intrinsic strength and durability. The natural color of the woods, protected by spar varnish, is maintained in the finish.

These specifications apply in their entirety to the model known as Grade A, and in part to the other models, B, C and D. The keel, frames, and planking of all are identical, the differences occurring in the seats, decks, gunwhales, etc., and in the fittings and finish. All grades are made in 16- and 18-foot lengths with a width of 42 inches, and the two sizes weigh, respectively, 130 and 160 pounds, complete with oars and all fittings.

When the double-ended St. Lawrence skiff came into being the outboard motor was still a futuristic dream. Men used the oldtime white ash power plant or drifted with the current. But nowadays many boatmen who a generation ago might have been champion oarsmen put their reliance in gasoline, and prefer a rowboat adapted to its use. They may still row if they care to, but if they desire extra speed the portable kicker gives it to them.

Hence the St. Lawrence Boat Works has supplemented the skiff with a square-stern rowboat to which an outboard motor may be attached. In materials and grades it is identical with the skiff, except that it has a sternpiece of 1 1/8-inch mahogany, and boasts a feature that will endear it to the hearts of all motor enthusiasts. This consists of a lazyback erected ten inches from the stern and a covered locker behind it for the disposal of a can of spare gasoline, tools, batteries, and lubricating oil.

The Elto outboard motor, because of its safety tilting feature, its twin-cylinder opposed construction, its light weight, and its distant control feature, is recommended by the makers for use with the boat, but any other type of outboard motor is suitable as a power plant. Or the Palmer Y. T. type inboard motor may be installed.



Outboard Profile of Nelseco Diesel-Driven Houseboat

A Modern Twin Screw Houseboat

A Type of Craft Which Because of Its Seagoing Ability Is Rapidly Displacing the Older Less Seaworthy Type

THE largest yacht being built in the vicinity of New York is a steel power houseboat, designed by Henry J. Gielow for Louis H. Eisenlohr of Philadelphia. This yacht will have the distinction of being the first of this type to be equipped with heavy oil engines of the Diesel type. Mr. Gielow, the veteran naval architect, always turns out an attractive vessel, and has designed several power houseboats, notably the Captiva for Payne Whitney, the Gadfly and Connewago, and with his great experience, Mr. Eisenlohr will get a yacht up-to-date in every little detail and thoroughly well constructed.

This yacht which is being built at Kyle & Purdy's at City Island, New York, is 100 feet 9 inches over all, 95 feet 3 inches on the water line, 11 feet breadth and 4 feet 6 inches draught. The motive power will consist of two 6-cylinder Nelseco engines of 120 horsepower each. These will drive the vessel at the rate of 12 miles an hour. As her fuel capacity is 3,400 gallons, the yacht will have a cruising radius of 2,500 miles at full speed. This is unusually large for a vessel of this type.

The modern houseboat is displacing the older type steam yacht because it combines all the seagoing qualities of the older type and has much more accommodation. All the living quarters are well ventilated and light, and when equipped with the heavy oil engine it is a most attractive vessel that can be very economically operated.

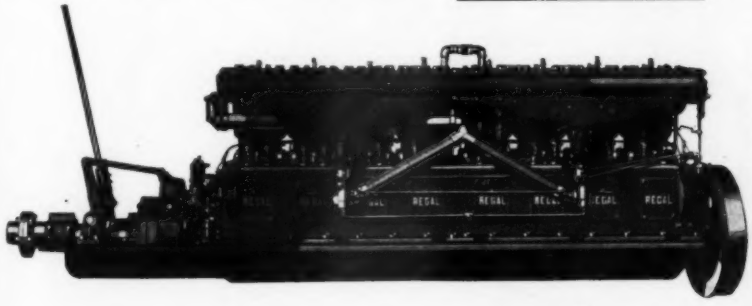
The deck house on the new yacht will be 44 feet long with a mean width of 14 feet. It will be constructed in mahogany panel work. At the forward end will be the dining room, 15 feet 6 inches long by 14 feet wide. This will be very handsomely appointed and furnished, and with square windows instead of the conventional round ports, there will be plenty of light and fresh air, and always a fine view of the surroundings under all weather conditions.

Aft of the dining room will be a butler's pantry, which will have a floor space of 74 square feet, and will connect with the galley below. Aft again on the port side will be a lavatory, and on the opposite side, a cabinet with racks for guns, fishing tackle, ammunition, and all sportsmen's supplies, for the owner intends to have some fishing and shooting on his travels.

The main saloon or social hall will come next. This will be a most attractive room 18 feet long in the clear, and occupying the full width of the deck house. It will be furnished with a piano, divan, desk, bookcase, and will be comfortable as well as attractive. A stairway from the social hall will lead to the owner's and guests' quarters below. These will be in the after part of the vessel, and will occupy a fore and aft space of 38 feet and the full width. The owner's stateroom at the forward end will have a floor space of 200 square feet, and will be furnished with a brass bed, chiffonier, mirrors and a large wardrobe. Forward of this will be the owner's bathroom, which will connect with the stateroom. Aft of the owner's room will be four more staterooms and two more bathrooms. The staterooms will be furnished with beds, bureaus and wardrobes, and the bath rooms will have porcelain enamelled lavatories, bath tubs, etc., with nickel-plated mountings, open plumbing and tiled walls and floors.

The machinery space which will occupy a space of 18 feet fore and aft and the full width of the vessel, is next forward, and then will come the galley with a floor space of 130 square feet, which will be equipped with range, dish racks, dressers, lockers, sinks, cold storage, etc.

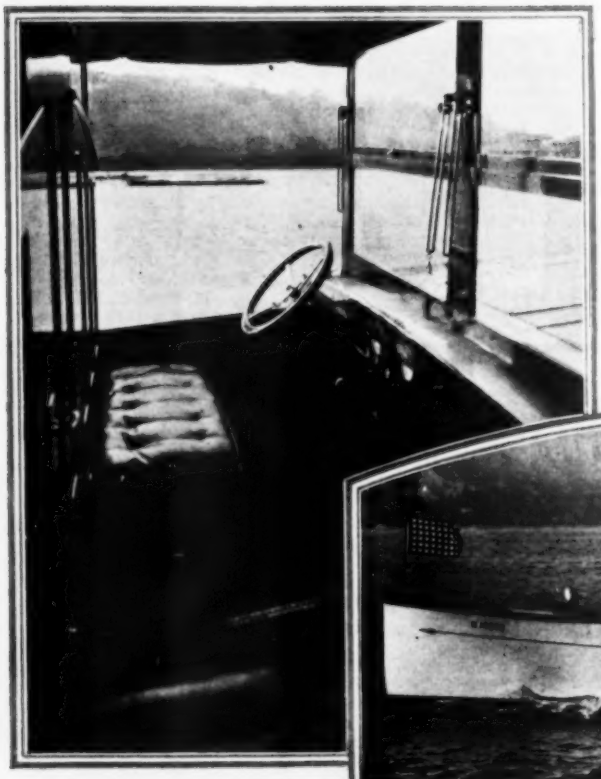
The officers' and crew's quarters, all designed on a liberal scale, will be forward of the galley.



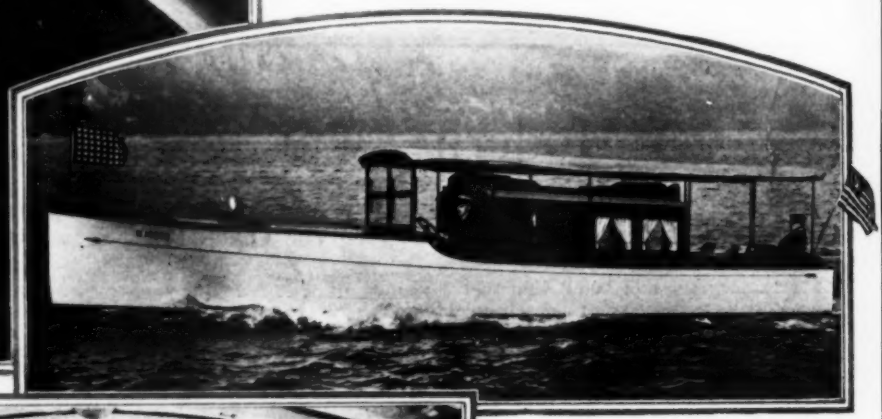
An unusual gasoline marine motor of 100 h.p. built by the Regal Gasoline Engine Company, Coldwater, Mich. This machine has 8 cylinders with a bore and stroke of 7½ by 9 inches. It is a low speed machine, the maximum revolution rate being 400 r.p.m. It weighs 8,500 pounds and can be supplied for either right or left hand rotation. For cargo vessels and fishing or commercial boats of the extra heavy type this engine is particularly well suited

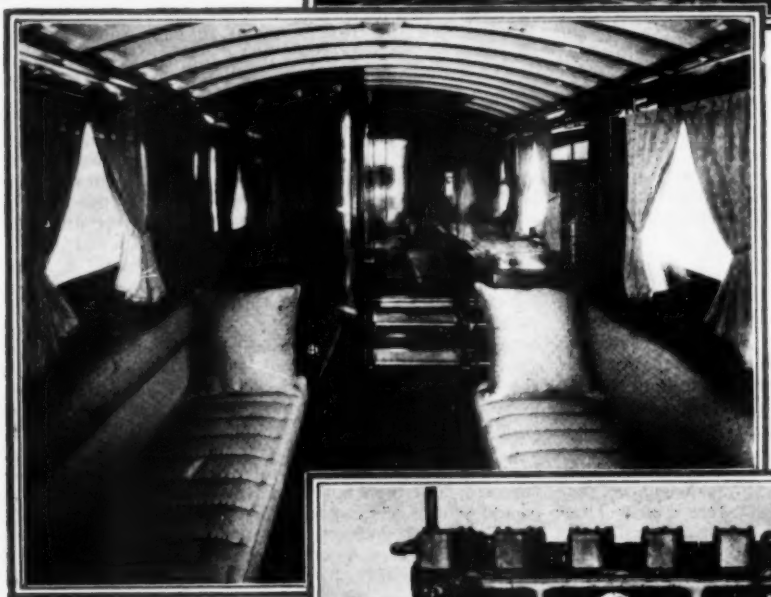
Day Cruiser Has the Spotlight

Feature of Boat Exhibit of the Consolidated Shipbuilding Corp., is a 38-Footer, Here Shown in Action



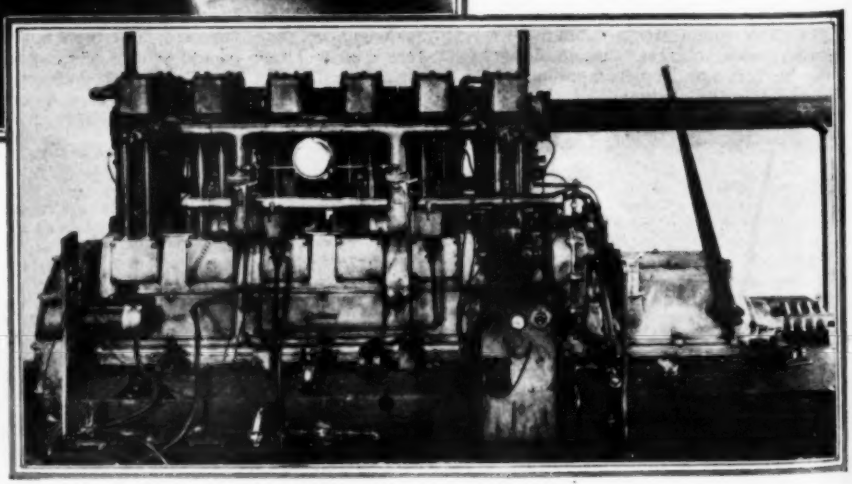
With the motor installed forward, all controls are brought to the amidships cockpit, which is protected by windshield and curtains





The cockpits communicate with the cabin, which is laid out with small galley and toilet forward and with two convertible transom seats aft

The 38-footer, the feature at the Show of the Consolidated boat exhibit, is a clean, smooth-running day cruiser, with amidships and after cockpits and central cabin



The feature of the Consolidated engine exhibit is the new 300 h. p. Speedway engine, here shown on the test blocks. A complete line of Speedways is being shown

What You Will Find at the Motor Boat Show

An Unusually Interesting Display of Motor Boats, Marine Engines and Accessories for the Inspection of Critical Motor Boat Enthusiasts—Descriptions of Representative Exhibits Shown at the Grand Central Palace

FOR the benefit of the thousands of motor boatmen throughout the country who anxiously await the coming of the Motor Boat Show each year, and who unfortunately are unable to visit the show in New York City and examine the display of engines, hulls, and accessories, we take a great deal of pleasure in presenting a synopsis of the exhibits which will be found at the Grand Central Palace this year. From present indications you will be interested to know that the coming season of 1922 promises great activity and prosperity for the boating world, and the show, which commences on February 17th and continues until the 25th promises to be more successful than any of the shows which have preceded it. For your guidance a complete list of exhibitors with names of representatives in charge as well as their New York hotel addresses will be found on pages 14 and 15 of this issue.

Hall-Scott Shows Duplicates of Record Breakers

At the show this year the **Hall-Scott Motor Car Co., Inc.,** is occupying Block N, which was the last year's location, and is showing two sizes of the marine engines which have proven themselves so well suited for fast yacht tenders, runabouts, and fast cruiser. The "Balanced Four" 125 h.p. which is on display, is a duplicate of the engine installed in the popular Belle Isle Bear Cats and other smart runabouts. It is a motor well suited for the boats being built for the Gold Cup race to be held in Detroit next fall.

The six-cylinder 200 h.p. motor is a duplicate of the engine which drove Adieu to victory for the Fisher-Allison trophy at Miami in February, 1921. Another engine of the same model powered Nick Nack, which is officially the world's fastest single marine engine powered displacement runabout, in her record-breaking races in Toronto and Detroit last season.

Arthur J. Utz, manager of the eastern factory branch located in Buffalo, N. Y., who is in charge of the exhibit, pointed out recently that the Hall-Scott marine engines were introduced and made good in the boating field in a shorter time than any other engine of their type, due to their modern design and fine mechanical construction.

Kirby Service and Satisfaction

Kirby marine paints have been manufactured in New Bedford, Mass., since 1846, and with the growth of the city and the advancement of the paint industry have progressed in popularity and reputation until now the **George Kirby, Jr., Paint Company** is a leader in its field. George Kirby, Jr., who incorporated the present company in 1909, first introduced red and green composite, more popularly called red and green copper paint, immediately at the expiration of a patent on copper paint, a brown, which was the only one of its kind used up to the placing on the market of these new products.

Perhaps the most popular article manufactured by the company to-day is its flat yacht white, although green and red yacht composite, old style brown, red copper and New Bedford bronze have also stood the test of years, and have been brought to a high point of merit by test and improvement.

The spirit of the Kirby plant is one of individual interest, combined with cooperation between management and worker. All hands, including the ultimate consumer, gain by this spirit, for it necessarily follows that production and service will be the result of pleasant working conditions and loyalty. Everyone connected with the organization, from the president down, is placed upon a yearly salary basis, and many of the men, as well as the officers of the corporation, have been long in the employ of the concern.

Both the marine paints and other lines of Kirby make are handled by agencies and boat-builders and other concerns the length of the Atlantic coast, from the tip of Maine to the southern bit of Florida. The aim of the organization and its subsidiaries has been in the past and will continue to be service and satisfaction.

Zundel Has Usual Space

In exhibiting at their usual space, Nos. 72 and 74, **R. W. Zundel Co., Inc.,** of New York City, look forward with pleasant anticipation to renewing old acquaintances and making new ones. Their exhibit includes brass and galvanized marine hardware, attractively displayed, electric horns, bilge and circulating water and oil pumps, spark coils, Comet magnetos and generators, as well as a line of stoves, including the celebrated Kamp Kook gasoline stove, alcohol stoves, and Jewel kerosene stoves.

The Harvey Two-Cycle Line

The Harvey Marine Motor Co., of Rochester, N. Y., is in production with the well-known line of two-cycle motors formerly called the Leary gas engines, and is featuring the four-cylinder model especially. This motor has several improvements, including the rear starter and reverse gear combined, speed controls, and a few minor details in connection with the ignition and lighting system. Weighing 463 pounds in iron and 367 pounds in aluminum, this motor develops 20-32 h.p. and is declared to be a smooth-running machine with speed control and easy starting equal to any automobile engine.

There are four other models in one, two, three, and six cylinders, and all embrace the famous Leary twin-port feature, whereby four-cycle reliability is combined with two-cycle simplicity and economy. Harvey motors are constructed of standard parts on improved mechanical lines and are sold guaranteed free from defects of workmanship and material for one year from date of purchase.

W-C Features Driboat Pump

In Booth 108 at the Palace, **Wilcox, Crittenden & Co., Inc.,** of Middletown Conn., are showing their familiar line of marine hardware and are especially featuring their new power bilge pump. This is regarded by the company as superior to their Pequot pump, because it can be started at will. Spur gears have been resorted to to achieve this very desirable end, a special bronze spur gear being attached to the propeller shaft at the point where the pump is to be placed. This gear is made in two parts and is held together by screws through flanges which are a part of the gear. A set screw holds the gear in place on the shaft.

A similar gear is attached to an eccentric shaft on one end of the pump, by means of which the two gears are meshed or disengaged at the convenience of the boatman. The eccentric shaft is operated by means of two toothed segments controlled by a vertical lever and arm, which, upon installation in a boat, may be extended by rods and bell cranks. The pump may be thrown in and out of action without slowing the engine, and if the propeller shaft is reversed the gears automatically disengage themselves.

The Driboat pump, as it is called, is of the simple plunger type with a capacity of six quarts a minute at 530 r.p.m. Its safe maximum speed is 600 r.p.m.

Hyde Propellers

In conformity with its usual practice the **Hyde Windlass Co.** of Bath, Me., is showing its regular line of Hyde turbine type and No-Weed propellers. In addition to them there are on display enlarged photographs of Miss America II and other fast boats which Hyde propellers have driven to victory.

Niagara Has New Small Motor

The **Niagara Motors Corp.,** of Dunkirk, N. Y., has recently announced in addition to its various models, the new Niagara Special 10-15 h.p. motor. This newest Niagara meets the demands of that section of the motor buying public which wants a relatively small motor at the lowest possible price consistent with the best in engineering, material, and workmanship. The Special is built for both medium and high speed service, and one user has declared that "the little motor is equally at ease at 500 or 1,500 r.p.m."

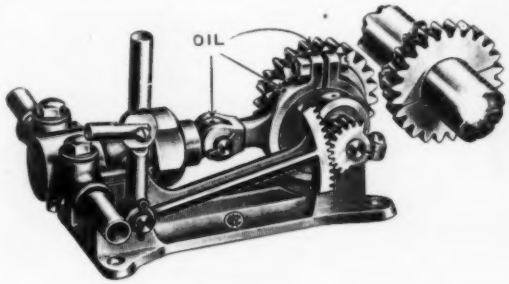
Accessibility, with accompanying economy of upkeep, was carefully considered in the design of the engine. The removable cylinder head, with copper asbestos gaskets, makes inspection, adjustment, and cleaning of cylinders, valves, pistons, and pins matters of the utmost simplicity. The crankcase is solidly supported by being cast in with the cylinder blocks, and the crankshaft is suspended on unusually liberal bearings. The timing gears and reverse gear are fully and completely enclosed, thereby eliminating the possibility of released oil or grease. At the same time, the gears can be gotten at completely and handily in very short order.

The specifications of this motor are as follows: It is a four-cylinder, four-cycle, of the L-head type, with bore and stroke of 2⅝ x 4 inches. The medium-duty speed range is from 600 to 1100 r.p.m., giving 5 to 12 h.p.; and the high-duty range is from 1000 to 1800, developing 10 to 15 h.p. The cylinders are cast en bloc with long water jackets, cover for tappet chamber, and hand hole cover for inspection of the crankcase. The water pump is of the bronze gear type and lubrication is by circulating splash with oil level and oil sight gauge. Ignition is by battery coil and timer system or by high tension magneto. The reverse gear, of heavy duty type, has ball bearing thrust and runs in oil. The engine rotates left hand. A special combination manifold allows use of kerosene or low grades of gasoline.

An outstanding attraction of the Special is the fact that it is sold, complete with reverse gear, carbureter, ignition, etc., for $235 to $310, according to the equipment.

Masters Has Big Mid-West Plant

Reputed to be the largest marine engine dealers in the Central West, **W. L. Masters & Co.,** of Chicago, Ill., represent the highest grades of engines, and carry an unusually large stock of service parts. They are the distributors for Sterling, Evinrude, Kermath, Scripps, Universal and Frisbie marine motors and for Joe's reverse gears and Hyde propellers. A large part of their attention is devoted to the rebuilding and sale of used marine engines, and they have the facilities at hand to overhaul them and turn them out like new.



The gear-driven pump for keeping the bilge dry. Shown at the Wilcox Crittenden Co.'s display, Space 108

Johnson 35-Pound Motor

The **Johnson Motor Co.**, of South Bend, Ind. manufacturer of Johnson motor wheels and Quick-Action magnetos, is featuring at the Show the Johnson outboard motor, which is of twin construction and weighs only 35 pounds. Inasmuch as both cylinders fire at the same time, this motor is said to be practically without vibration, while, despite its light weight, it is listed at 2 full h.p. One of the features of the Johnson is its rope starting device which eliminates danger and annoyance in getting under way. Reversal of the propeller, and therefore of the direction of travel of the boat to which it is attached is another feature, and this ability to turn the motor around facilitates warping away from a dock. The motor automatically tilts upon striking any obstruction, thereby making it possible to cruise without damage in extremely shoal water. Steering is accomplished by turning the motor by means of the steering handle, hand rail, or tiller ropes.

Brooks Knock-Down Boats

The **Brooks Mfg. Co.**, of Saginaw, Mich., manufacturers of knock-down motor, sail, and rowing boats, are increasing the capacity of their plant and are adding to their line three new cruisers and three new runabouts. Their already extensive line of all types of motor craft has attained wide popularity among boatmen who prefer to build their own craft.

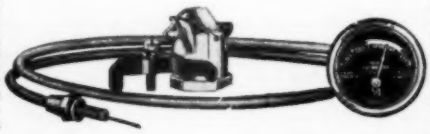
The patterns sold by this company are printed on heavy paper, the exact size of the parts they represent. Each pattern is distinguished by numbers or letters, corresponding to similar numbers or letters shown on the illustrations and referred to in the bill of material, making it easy to compare with the instructions at any point of work. The Brooks knock-down frames consist of all woodwork necessary to construct the hull to that point where it is ready to receive the planking and decking. All frames are made of selected white oak, and such parts as the stem stemknee, keel, sternpost, horntimber, transom, and harpens are finished, rabbeted and fitted, ready to fasten in place. Cypress planking only is furnished by the manufacturers. As provided, the planking is cut to shape for all but a few of the boats, while the material for decking and covering boards is dressed to proper thickness.

Reduction in Buffalo Prices

The **Buffalo Gasolene Motor Co.**, of Buffalo, N. Y., issued recently a new price list which shows many changes in the downward direction. The new prices, which on the average show a reduction of 25 per cent., are the result of improved manufacturing facilities and the reduction in the cost of material and labor. Other cuts in Buffalo prices have been announced during the last two years, but in the present announcement the listings touch a new low water mark.

One of the most popular models of the Buffalo line is the 25-30 h.p. cruiser and runabout engine, and as an indication of the way prices have been trending we note that in 1920 this motor sold for $1,400, while it is now listed at $1,000. An even more radical cut has been made in the case of the 40-60 h.p. cruiser and runabout engine, which in 1920 sold for $2,625 and is now listed at $1,600, a saving for the purchaser of more than a thousand dollars. The 50-80 h.p. engine for cruisers and runabouts now sells at $2450, which is a gain for the consumer of $880 under last year's price.

Material reductions have been made also in the heavy-duty models, varying slightly with each model according to individual manufacturing costs. No blanket reduction has been effected, and, in fact, in one instance the price of a model has been slightly increased.



The Hobbs heat indicator, manufactured by the Borg & Beck Co., of Chicago, consists of a dial having an indicating hand which is connected to an efficient thermostat mounted against the motor block by a special clamping device. It is purely mechanical in operation

Specialists in Rebuilt Motors

Possibly the first man to exchange marine engines and rebuild for resale the old motor on a commercial scale, and the first really to run it as a fulltime business was William Bruns, who opened a little shop in New Jersey, where for years he conducted the Bruns Motor Exchange. That little shop was the humble beginning of the present concern, **Bruns, Kimball & Co.**, with headquarters at 153-159 West 15th St., New York City, and branches in Philadelphia and Jersey City. From the tiny shop at the beginning, this company now exhibits almost 300 new and rebuilt machines on 18,000 square feet of floor space and maintains shops where in the busy season many mechanics are given employment.

The rebuilding of motors to-day is not the haphazard process that it was in the early days of the industry. Almost as much equipment and practically the same kind of equipment is required in the shops of **Bruns, Kimball & Co.** as in a factory where new motors are produced. Rebuilt engines to-day are subjected to the same tests as when they originally left the factory. When a motor comes to the receiving department it is examined first for missing parts, cracks in the cylinders, etc., and it is then delivered to the inspection department where it is entirely dismantled and cleaned. Each part is then minutely examined and the shop foreman is advised of the parts requiring replacement. The main castings are tested for possible small cracks not clearly visible, and if none are found the lower base is placed on skids and the crankshaft and bearings given every attention which they require. Bearings are scraped to fit or new bearings are poured, and the same operation takes place with camshafts, idler gear, bushing, connecting rod bearings, etc.

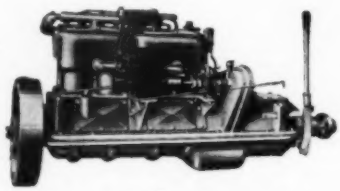
Seventy-five per cent. of the rebuilt motors have their cylinders rebored, while new rings, piston pin bushings, and usually piston pins are supplied as a matter of routine. Manifolds, water connections, etc., are put on with care, new gaskets being fitted, magneto magnets are revitalized when necessary, and carbureter floats substituded—in short, every part of the motor is gone over and is replaced or repaired if it shows failure. The result of this painstaking attention is that when the rebuilt motor is placed on the floor for sale it has been giving an entirely new lease of life and is good for as much service in the future as it has rendered in the past.

Carpenter Has Full Line

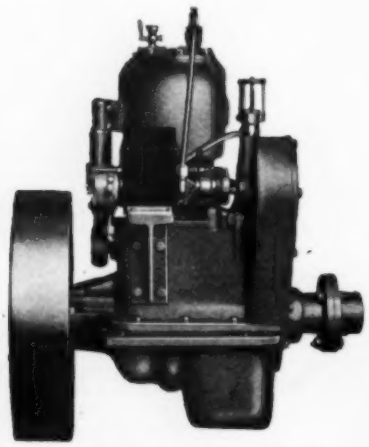
George B. Carpenter & Co., of Chicago, Ill., are exhibiting in Booths 37 and 39 a very complete line of their marine hardware specialties and supplies. Features of the display are the Kainer ropeless steerer, the Kainer self-starter and the Carpenter searchlight control. The latter is a universal control which accomplishes both movements of the searchlight by means of one rod. That is, the searchlight, mounted on deck, or overhead, can be operated from the bridge or cabin, and one rod controls its elevation and depression and its range. Messrs. J. W. Sackrider and Allen C. Forbes are in charge of the space.

Price Reduction for Leemon 30-Footer

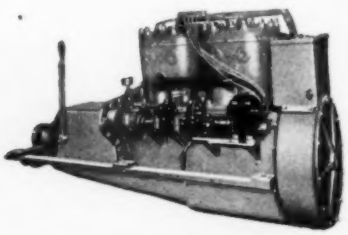
An extremely interesting announcement comes from the **Leemon Boat Co.**, of Cambridge, Md., to the effect that a price reduction of $500 has been made for this company's 30-foot day cruiser. It is now sold at $2,800 for the complete hull, without motor, but including tax. This 30-footer which is the first model of a new line of standardized boats, has a beam of 8 feet 3 inches and draft of 2 feet 9 inches. It is of the double-cabin type, with trunk cabin having comfortable accommodations for sleeping, and with toilet and large clothes lockers forward. The after cabin contains the galley, and the motor is in a compartment beneath the bridge deck which is entered from either the main cabin or the galley. The main cockpit, twelve inches below the deck line, is self-bailing. It is provided with a deck seat and will accommodate several deck chairs. Staunchness, reliability, and seaworthiness are among the principal features of the craft.



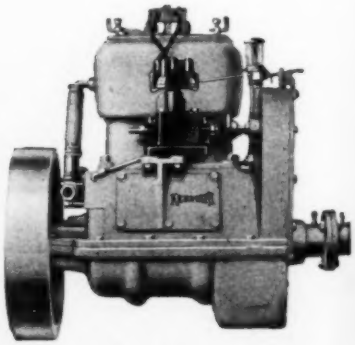
The 4-cylinder 4-cycle motor is made in three sizes, the 10-12 h.p., the 16-18 h.p. and the 20-25 h.p. models



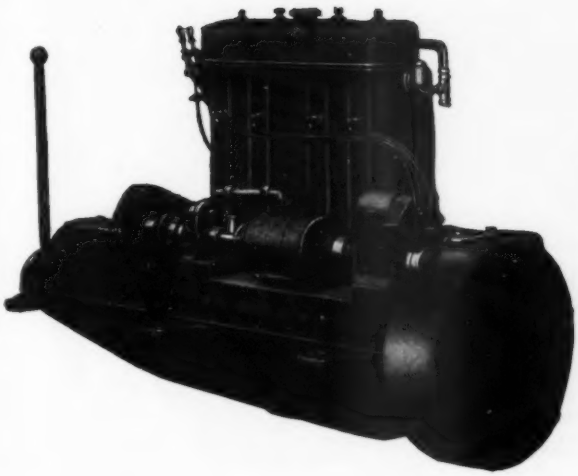
The single cylinder 4-cycle Kermath develops 3-4 h.p. and uses the same parts as larger motors



The largest of the Kermath line, the 4-cylinder 40 h.p. model



The 2-cylinder model is made in two different sizes, one, 4-5 h.p., the other 6-8 h.p.



The 1922 Gray motor is neat in appearance, compact and readily installed in runabouts and cruisers. A motor which operates smoothly and quietly at speeds up to 2000 r.p.m. and most economical in service

Masten Features Life Preservers

C. H. Masten Co., Inc., of New York City, manufacturers and jobbers of marine supplies, are exhibiting in space J on the first floor at the Lexington Avenue end of the Palace. In addition to representative items from their line of marine upholstery and draperies, they are featuring their patent life preservers and Caille Perfection motors.

Regal Has New Model

The **Regal Gasoline Engine Co.,** of Coldwater, Mich., has come East for New York's big mid-winter event with an exhibit of five marine engines, comprising the 2 h.p. Model Y, the 12 h.p. EB, the 20 h.p. UC, the 36 h.p. JC, and the 50 h.p. SC. The newest engine in the Regal line, but one which has already attracted a great deal of favorable attention, is the 100 h.p. SH, an eight-cylinder engine with a speed range of from 150 to 400 r.p.m. It is designed for use in cargo or fishing boats, where its great power in one unit gives a saving of space.

The engine measures 12 feet 6 inches from the outside face of the flywheel to the middle of the clutch coupling for the propeller shaft. It is, in effect, a doubling of the 50 h.p. SC model, for its cylinders are of the same bore and stroke—7½x9 inches. Double ignition by distributor, coil and battery, and magneto, is supplied, with two spark plugs for each cylinder. Starting and operation can be effected by either system. A twelve-volt electric starter and lighting generator is supplied.

The reversing gear has a backing ratio of 80 per cent. of the forward speed. As an explosion occurs at every quarter revolution of the three-inch crankshaft the engine runs like a steam engine—without vibration—and throttles to a slow speed, requiring little attention other than occasional inspection of the oil feed and bearings. The motor is adapted for installation in boats of 65 to 80-foot overall length.

New Ritchie Pelorus Introduced

E. S. Ritchie & Sons, of Brookline, Mass., manufacturers of compasses and nautical instruments, carry an especially full line of equipment for all sizes of motor boats and yachts. The Ritchie compass is too well known to require comment here other than that it has been manufactured for over seventy years and that the quality of workmanship and accuracy is better to-day than ever before. They have a special non-magnetic observatory where compasses are tested for accuracy and magnetic strength, and are always ready to test compasses and supply inspection certificates where desired.

Besides compasses they carry a full line of mahogany and brass yacht binnacles. Their shelf mahogany binnacle or skylight brass yacht binnacle is an excellent equipment for the smaller motor and sail boats. Some compasses on the larger boats require compensating, and the Ritchie compensating binnacle standards are designed especially for this purpose. The Ritchie azimuth circle is the standard Navy instrument for use with the U. S. Navy compasses, and for smaller boats the concern has designed azimuth and bearing instruments which have the same general features of the more expensive articles. The Ritchie people are now bringing out a new yacht pelorus with 5" dial, which has the best features of the Navy pelorus, is light, compact, and is furnished complete at a very reasonable price.

Kermath Introduces One-Cylinder Job

Prominent in the exhibit of the **Kermath Mfg. Co.,** of Detroit, Mich., is the new one-cylinder motor which develops 3 h.p. A valuable feature of this latest addition to the Kermath line is the standardization of parts, for they are the same as in the Kermath model 16 four-cylinder engine and can be secured at all boating centers if necessary. The motor starts easily and has perfect control for slow speed landing or trolling. It is rated at a lower horsepower than other engines of the same size because the manufacturers believe that one-cylinder engines should be run at lower speeds to cut out vibration. Perfect counterbalance and light reciprocating parts are declared to have eliminated vibration entirely from this model.

The motor has bore and stroke of 3¼ x 4 inches and the valves open 1¾ inches in the clear. The oil pump and the water pump are of the bronze plunger type, and the carbureter is a Kingston with gasoline strainer. Bosch magneto with impulse coupling is supplied.

Besides this attractive little motor, the manufacturers are showing at the Palace their two-cylinder 6—8 h.p., and four four-cylinder models developing 12, 16, 20, and 40 h.p.

Baby Dolls Feature Red Wing Display

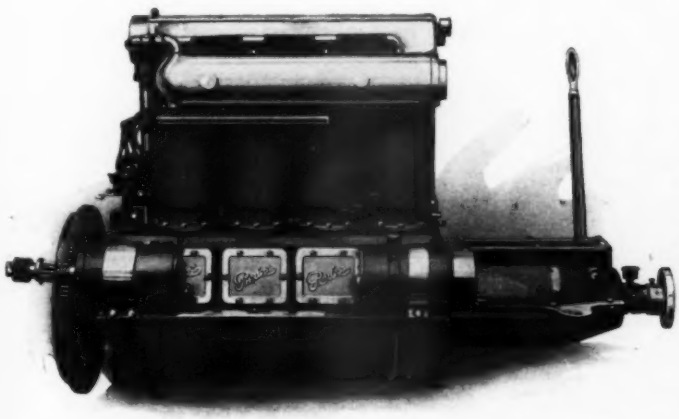
Baby Dolls are the feature of the exhibit of the **Red Wing Motor Co.,** of Red Wing, Mich., because that is the name given to the new Thorobred whose introduction has already created a wide demand among the users of smaller motor boats. This engine, otherwise known as the Model D, is rated at 10-14 h.p. Some of the Baby Dolls exhibited have gray iron oil pan and reverse gear cover, and others have aluminum pan and cover, while still others are provided with electric starting equipment.

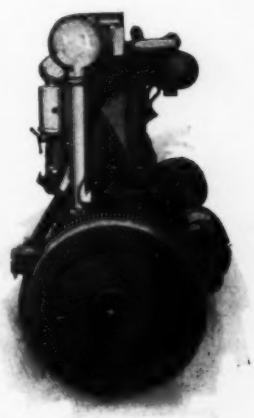
Besides this model the company is exhibiting other models of its popular line. These include the Model A, with a bore and stroke of 3½x4½ inches, the Model AA, which is a quarter inch large in both bore and stroke, and the Models F and B. The Model F is the popular 28-36 h.p. Thorobred with bore of 4 1/16 by stroke of 5 inches, shown with iron base and with aluminum base, and with and without electric starting equipment. The Model B has a bore of 4½ inches and a stroke of 5 inches.

In addition to this large engine display the Red Wing exhibit includes a yacht tender equipped with the Baby Doll. The tender was designed and built by Frederic S. Nock, of East Greenwich, R. I., and is an attractive model.

Kauri Panels Attractive

In Booth 26 the **Brooklyn Varnish Mfg. Co.** has a display consisting largely of a group of panels finished with the well-known Kauri varnish. These solid panels, measuring five by eight feet, are cut from the burl found on giant California redwood trees. The burls are very rare, growing on the trunks of the giant trees in huge swellings which are probably the result of injuries to the trees during their growth. Developing into a mass of woody tissue of intricate design, the burl is considered by many the most beautiful wood in the world. It takes from three to five years to season a burl preparatory to cutting it into panels such as those on display. Due to the purchase of the redwood forests by the U. S. Government, the supply of these burls is nearing exhaustion. The ones on exhibition were procured under the most difficult circumstances and are of great value. Protected with the rich, weather-resisting finish of water-proof Kauri varnish, they will last indefinitely.





End and side views of the new high-speed Peerless motors designed particularly for fast work. A light-weight motor developing 125 h.p. in the 4-cylinder size at 1650 r.p.m.

Harthan Propellers

Harthan propellers have been on the market for many years and are used on a multitude of craft where accuracy of design and pitch is sought by their owners. They are of the true screw pattern and are made of tough bronze which permits a thin blade and together with an extra high polish, reduces the power absorbing element to a minimum. These propellers, manufactured by the **McFarland Foundry and Machine Co.**, of Trenton, N. J., are made with two or three blades, right and left hand, and with practically any pitch desired. Particular emphasis is laid on the balancing of them and the hand filing, buffing and polishing is performed by the most skilled workmen.

Caille's New Watermobile

An interesting development of the marine business of the **Caille Perfection Motor Co.**, of Detroit, Mich., is divulged in its announcement of the Caille Watermobile, a 16-foot rowboat. This boat, which is of superior type will be equipped with a Caille Bantam motor. The company does not intend to build all of the boats but will arrange with good, reliable boat builders in different parts of the country to manufacture the boats and install the motor according to its specifications. By this means the purchaser will be saved excessive freight charges to far points.

This boat, with various Caille motors, is on exhibit at the booth of **G. H. Masten Co.**

Michigan Engine Improved

Improvements in the Michigan engine, manufactured by the **Michigan Marine Motor Corporation,** of Detroit, Mich., have been effected in the direction of reduced vibration and increased accessibility. The camshaft has been perfected, increasing the power output, and provision has been made for removing all lateral motion of the shaft. For the purpose of making adjustments, the manufacturers have installed a hand hole cover screwed in the bottom of the motor and seated on a flange to insure its being leak-proof.

This little single-cylinder engine, which is of the four-cycle type and is rated at 4½ h.p., is unique in that its vital parts are interchangeable with Ford parts. It is provided with automobile type of control for spark and gas and is equipped with Kingston or Schebler carbureter. The motor is hung in the foundation instead of being set on top, the purpose being to reduce vibration. Fitted with battery ignition the engine sells for $115, and with Bosch magneto for $135.

Spinaway Boat Motor

Simplicity is one of the principal features of the Spinaway outboard motor produced by the **Spinaway Boat Motor Co.**, of Freeport, Ill., and simplicity has been arrived at not only in design, but in operation, and in maintenance. All the parts are interchangeable, and should new parts be needed they can be installed without expert help. The motor is intended for use by persons who are deficient in the knowledge of mechanics as well as by those who take pleasure in a smooth running, efficient piece of machinery.

This motor is sold complete with built-in reversible magneto for $95, and for $5 less with battery ignition. The magneto is of an unusually effective and simple type, having no brushes, commutators, or bearings. High grade permanent tungsten steel magnets are mounted wholly within the flywheel and are protected from injury. The armature is mounted on an arm similar to the timer of the battery motor and has platinum make and break points. It can be shifted for changes in speed.

Other features include underwater exhaust, manganese bronze rudder, adjustable supporting bracket, etc.

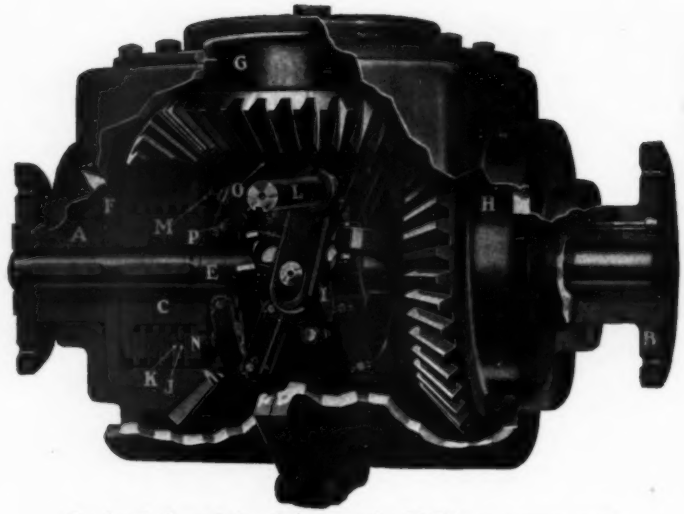
Full Doman Line Displayed

The Doman engine division of the **Universal Products Co.**, of Oshkosh, Wis., is showing a full line of Doman marine engines comprising the following models: The Model K 4 h.p., the Model HM-2 12-15 h.p., the HM-4 25-40 h.p., the LM-4, and the TM-4.

The Model K, also called the Bull Dog, is a single-cylinder engine of Doman lineage, embodying the same design and construction as the older members of the family. It has overhead valves and both intake and exhaust are mechanically operated. The head is removable, and handholes plates are provided. Regular ignition is by jump spark, with Cuno distributor and Detroit coil, and at an additional charge a magneto is installed. The exhaust and inlet manifolds are cast integrally to preheat the fuel and increase the efficiency of the motor.

The two-cylinder Model HM is a unit power plant for medium duty use. A cylinder block of T construction is employed, and large cooling surface and perfect accessibility to all parts are provided. The four-cylinder HM is similar in design with the same 4¼x6-inch cylinders in two blocks. In both models magneto ignition is regularly equipped and starting and lighting fixtures may be applied.

The TM-4 is intended for heavy duty service, and is a four-cylinder engine of 750 inches displacement. A non-racing governor handling all variations of speed and load is provided which controls the amount of mixture entering the intake manifold. The cylinders are cast singly and are of the T-head type with removable heads.



Sectional view of the vital parts of a McKinnon reverse gear as manufactured by the McKinnon Iron Works Co.

Palmer Has Representative Line

Palmer Bros., of Cos Cob, Conn., are showing as in other years a representative display of their two-and four-cycle marine engines. These are in one, two, three, four and six cylinders, and in their application to various types of boats practically cover the marine field.

One of the most recent Palmers which has met with enthusiastic approval among users of fast runabouts and cruisers is the Model VH, a four-cylinder engine with valves in head and overhead camshaft. It is completely enclosed, and is designed for quiet, clean and efficient operation. The cylinders are cast en bloc and have large water spaces around the cylinder walls, properly cooling cylinders and pistons under the most trying conditions.

Lubrication is accomplished through the use of a geared type pump, driven off the vertical shaft. The oil is led to the main crankshaft bearings, vertical shaft and camshaft bearings under pressure, and the connecting rod and cylinder wall lubrication is by splash from troughs located in the subbase which are supplied with oil returning through the vertical shaft assembly. The rocker shaft and its assembly is oiled by gravity feed through the hollow rocker arm shaft, which receives its lubricant from the camshaft leads.

The motor is regularly equipped with generator and starting motor. The starter of the inboard type is mounted on a cradle at the forward end of the sub-base. It operates by Bendix drive in mesh with a steel ring gear shrunk on the flywheel. The generator turns by silent chain off the crankshaft, and is mounted on the clutch case. Both are easily removable.

Ignition is by high tension magneto, driven through bevel gears off the vertical shaft. The magneto is readily removed or installed.

Tidewater Cypress

Attention was recently called by the **Southern Cypress Manufacturers' Assn.**, of New Orleans, La., and Jacksonville, Fla., to the meaning of the arrow shaped symbol which appears on the ends of all boards and small sticks of genuine cypress. As will be remembered, this symbol consists of an arrow with a rough circle along its shaft, and the initials S C M A. In the center of the circle is branded the number of the mill producing the wood and this number, together with the symbol, is the purchaser's guarantee that the wood he buys is genuine tidewater cypress.

The advantages of cypress in boat-building have been recognized for more than two centuries, for the wood seems peculiarly adapted to the taxing nature of marine service. Whether entirely submerged or subject to the particularly wearing influence of air and water combined, the wood resists shrinkage, warping and rot, and gives the ultimate in longevity.

Comet Marine Lighting Sets

An extensive representation of the electrical apparatus manufactured by the **Comet Electric Co.**, of Indianapolis, Ind., appears at the Show in the Willis booth. The Comet company specializes in generators, magnetos, lighting plants for marine and shore use, switchboards, etc. Four types of the marine lighting sets are manufactured, and in all of them the aim of the manufacturers is to combine compactness with maximum efficiency. The generators are of rectangular form, as this takes less boat space and allows for maximum winding, and the entire field frame is made of special electric iron to give the greatest magnetic circuit. The armature is of the laminated type and the armature slots are carefully insulated with approved fiber and carry the double insulated windings. The commutator is massive in construction and is made of special close-grained tough copper.

Owing to the varied conditions under which marine generators must operate, the Comet types may be fitted with a variety of drives. The standard is a flat flanged pulley for one-inch belt, but they may be fitted with round belt pulleys, round or flat belt governor pulleys, bevel or flat face governor friction, or spur friction drives. The generators are made in 6-8 and 12-16 volt types delivering 5 and 15 amperes.

Tvedt's Adjustable Quadrant

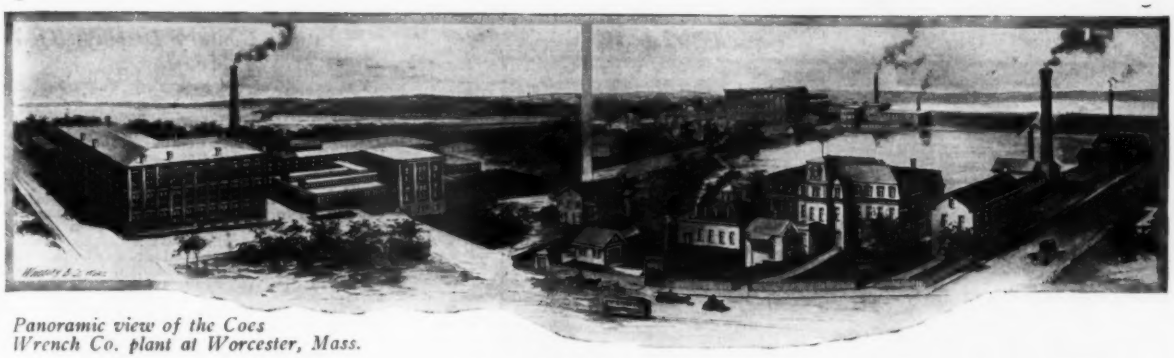
One of the most useful articles manufactured by the **Tvedt-Smith Co.**, of Cherry Valley, Mass., and New York City, is the Tvedt adjustable quadrant. This device may be installed on new or old craft, but perhaps it is most appreciated when through some accident the rudderstock has become twisted and the oldtime quadrant, keyed to the rudder stock, fails to give full rudder in one direction or the other. While the boat is in the water it is difficult to correct the damage. However, with the Tvedt adjustable quadrant the compensation is readily made, and the boat may be steered from the bridge as before.

The Crescent Line

By specializing in St. Lawrence River skiffs and outboard motor boats, the **Crescent Motor Boat Co.**, of Clayton, N. Y., and New York City is able to achieve a satisfactory combination of quality, workmanship, and price. At the show they are displaying their 16-foot double-end S. Lawrence River skiff, and their 16-foot outboard or inboard motor boat. The former, which is decked over forward and is supplied with two rowing thwarts and stern seat is sold for $90, and the latter, a beamier boat, intended for motor propulsion, is priced at $140, including oars, war tax, and crating. Two other styles, a little more elaborate, are offered at slight advances in price.

Tobin Bronze

The **American Brass Company,** of Waterbury, Conn., makes a marine specialty of Tobin bronze, an alloy which combines high tensile strength, smoothness, toughness, and resistance to corrosion and fouling. It is suitable for all exposed or underwater parts of motor boats where these qualities are desirable, and is extensively employed for rudders, wheels, struts, skegs, and propeller shafts. Architects and boat owners who have personally observed the corrosive effects of salt water on boat fittings appreciate the quality of this alloy.



Panoramic view of the Coes Wrench Co. plant at Worcester, Mass.

Coes Wrenches Continue in Popularity

The **Coes Wrench Company,** of Worcester, Mass., announces several refinements in design as the only changes in their line for the current year. Nothing basic will be changed, as no weaknesses have come to light through usage in the various manufacturing fields. Closer limits of manufacture, together with modern automatic machinery and careful heat treatment bring the product closer to the precision tool class than ever before.

The three models of Coes wrenches—Knife-handle, Steel-handle, and Key-model—are continued from last year. The Knife-handle and the Steel-handle are made in the following sizes: 4, 6, 8, 10, 12, 15, 18, and 21"; and the Key-model in 28, 36, and 48" sizes, with a special 72" length on order. The outstanding features of the Knife-handle include an upset head whereby the original grain of the bar is retained, a mild steel jaw with extra tough wearing surface, solid screw with cut thread of substantial cross section, and bar extending through the handle frame and forming the final anchorage of the complete assembly.

The construction of the Steel-handle wrench follows the same general lines, the bar extending completely through the handle, which is a semi-steel casting. In sizes above the 10" the thrust of the screw is taken by a ball bearing.

The Key-model wrench is designed for extremely heavy duty and large work. With the exception of the semi-steel cast jaw the wrench is made throughout of heavy steel forgings. An extreme range of opening is obtained by the use of a sliding strap which gives two positions for the jaw assembly on the bar. The two positions have a positive key lock, preventing slip.

Piston Rings of Quality

Quality piston rings, manufactured by the **Piston Ring Co.,** of Muskegon, Mich., since 1911, have been developed with the industry and represent a corresponding advance in efficiency. These rings are made from a special formula of close-grained, tough, gray iron, and the mixture is watched and analyzed in the company's laboratory to keep it a few points softer than the proper quality of cylinder metal. The rings are cast individually by an original process which insures equal distribution of pressure and a true circle when the rings are finished. They are finished to the utmost practical limits of accuracy and are carefully inspected for the smallest imperfections. All standard sizes and standard oversizes are carried in stock, and each ring is guaranteed for quality and accuracy. They are made in both step-joint and diagonal types.

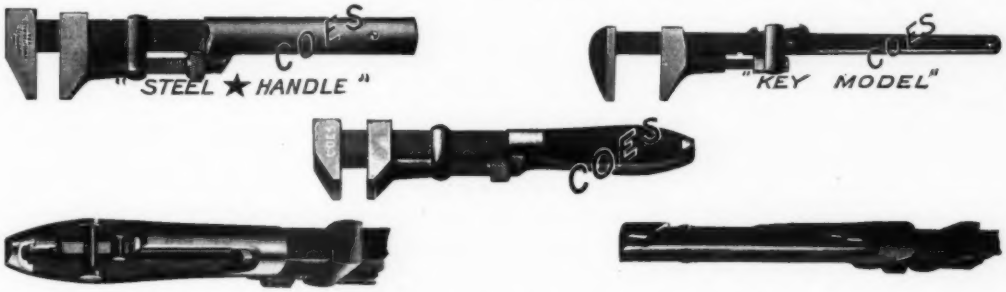
Self-Expanding Piston Rings

The product of the **Miles Piston Ring Sales Co., Inc.,** of Long Island City, N. Y., is a one-piece triple steel, self-expanding and resilient piston ring which is not affected by heat. It requires no filing or fitting to install.

As it adjusts itself to the cylinder wall and takes up the wear on the cylinder or the ring, it automatically expands, but the spring contact from the overlapping portions on the inside makes it impossible to cause a gap through which oil or gas would pass. This feature makes it unnecessary to pin the ring in two-cycle engines.

Erico Marine Specialties

Hubbard H. Erickson & Co., of Chicago, Ill., are exhibiting in Space 44 a practically complete line of the goods which they produce under the trade name of Erico marine specialties. These include running lights searchlights, column spark and throttle controls, bulkhead controls, steering wheels, universal shaft logs, cowl ventilators, dome lights, mooring bitts, etc. In addition to these the display features a new combination electric and hand-driven capstan, an electric power bilge pump and a cast bronze stern light.



Typical selection of Coes wrenches that will all get a good grip on obstinate nuts

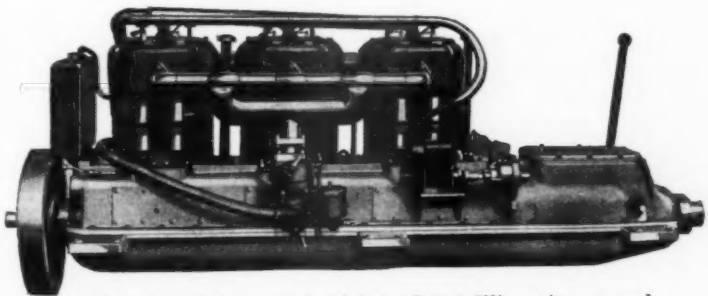
Racing Trophies

As specialists in the making of gold and silver loving cups and trophies, **J. E. Caldwell & Co.,** of Philadelphia, Pa., occupy a high place in the marine industry. One of their most interesting recent trophies is the Wood-Fisher Gold Challenge Cup, which was won by Baby Gar last September at Detroit. This is a two-handled bowl, of classical form, made of 14-karat gold. The laurel sprays growing out from the handles around the top of the bowl, the hydria laurel leaf decoration, and the fluting are finely chased. An applied molding, encircling the body of the cup, forms the lower edge of a panel, in which, chased in high relief, is a scene depicting a race between boats of the type which competed for the trophy. Above the racing scene, in proper colors are the crossed flags of the clubs of which the donors are members.

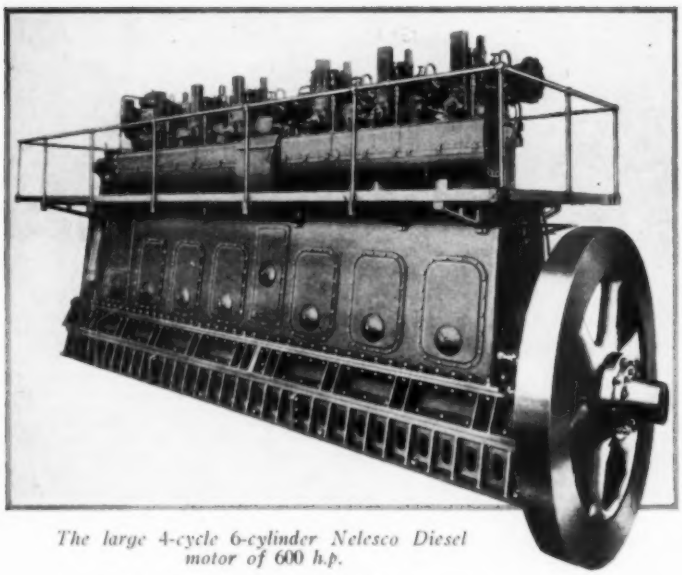
Hickman Shows 25-Foot Sea Sled

The **Sea Sled Company, Ltd.,** of West Mystic, Conn., is exhibiting at the Show a 24x5-foot Sea Sled equipped with a 40 h.p. engine, the first of a series of moderate powered Sea Sleds built to suit the average man's requirements. The boat has selected oak frames, is double planked with cedar on bottom and sides, and copper riveted throughout, built to the usual high standard of Sea Sled workmanship. The hull has topsides painted with trim finished bright. The single engine swings two surface propellers driving through gear box and universal joint, and with 40 h.p. engine installed the sled has a maximum speed of 25 m.p.h.

The control cockpit is aft fitted with upholstered bucket seat for helmsman, and the rear cockpit has also thwartship seat holding three passengers. The forward cockpit is large and roomy and can be fitted to suit the customer's requirements, standard equipment being thwartship seat full width of boat at after end of this cockpit. All seats have demountable cushions with upholstered backs stuffed with Kapok. The deck fittings are brass or bronze throughout, and the boat has regular equipment, including Hickman sideplate rudders and automobile type controls.



Port side of the model P. M. 5¾ x 7-inch Wisconsin motor of 120 h.p., 6-cylinders



The large 4-cycle 6-cylinder Nelesco Diesel motor of 600 h.p.

Ship Models at the Show

Of interest to the growing number of yachtsmen and art connoisseurs who are interested in ship models is the exhibit at the Palace of **Old World Arts, Inc.** of New York City, a concern which specializes in the making of models. The display is varied in its appeal and consists of models of numerous types of picturesque ships of greater or less antiquity. One is the William Hawkins slave ship, of the 17th century, and another an English pirate ship of the century following. A representation of the Mayflower is shown which will later be given to President Harding and the century preceding the coming of the Pilgrims is represented by models of a Dutch trader and a Mediterranean vessel. Columbus's famous fleet, the Nina, Pinta, and Santa Maria, duplicates of which are in the Smithsonian Institute at Washington, are also shown. All are shown in exact detail on a scale of one-thirtieth

Pierce-Budd Engines

Pierce-Budd engines manufactured by J. H. **Pierce,** of Bay City, Mich., are two-cycle, three-cylinder machines which have held enviable records in mid-Western racing events ever since their introduction in 1909. Last summer at the meet of the Mississippi Valley Power Boat Association at Peoria they won not only in their class of 150 cubic inches, but in the 215 cubic-inch class above them.

The 18-25 h.p. high-speed engine, selling at $450, and weighing 235 pounds, is of the two and three port system, and has patented features which are claimed to increase efficiency and economy. The cylinders, of the best grade gray iron, are cast singly without water jackets and the jackets are brass and are removable in case of necessity. The jackets extend down below all the ports, thereby cooling the cylinders their whole length. Equipment includes Bosch magneto, bronze bevel magneto gears, rotary pump, and float feed carbureter.

The 20 h.p. heavy-duty engine is similar to the above except that it is of heavier construction and is designed to operate at a maximum of 1,200 r.p.m. instead of 1,800. It is made in the three-port system only, and Atwater-Kent timer and coil and regular equipment.

Hess Mono Engine

The Hess Mono marine engine, made by the **Hess Motor Co.,** of Algonac, Mich., is an interesting one-cylinder four-cycle machine with jump spark ignition circulating oil system, hot spot manifold, and other modern features. Complete with Kingston carbureter, spark plug, coil, switch, and timer it is sold at $130.50. With the same equipment but with a Bosch high-tension magneto additional it is listed at $150. Various items of additional equipment are also sold, and a group outfit of 8 feet of bronze shafting, with stuffing box, stern bearing, propeller, and reverse gear is sold for $65 extra.

Isotta Fraschini Marine Engines

I-F marine motors distributed in the United States by the **Isotta-Fraschini Motors,** of New York City, are being shown in two types at the Show. One is a four-cylinder engine rated at 30-40 h.p., and the other a six with 65-75 h.p. capacity. Both are monobloc designs of neat exterior finish, with all moving parts enclosed, and equipped with integral reverse gears. The four-cylinder machine has a bore of 100 millimeters and a stroke of 140, and its normal turning speed is between 1,300 and 1,400 r.p.m. It is arranged with magneto and carbureter on the starboard side, and with vacuum tank attached. Large handhole plates are provided to give access to the crankcase. The six, known as Type L-60, has cylinder dimensions of 105 by 140 millimeters, but is otherwise much the same in design and construction as the L-30.

One of the Latest Diesel Motors

The **New London Ship and Engine Co.,** of Groton, Conn., have completed a large Diesel engine unit of 600 h.p. This machine follows their usual practice and has six vertical cylinders of the four-cycle type. It is intended to be a fairly high speed machine as machines of this size go and develops its rated horsepower at 225 r.p.m. In use aboard ship or in driving electrical machinery in stationary service ashore it fills every requirement of steady reliable power. Should the occasion require it can be built to be directly reversible for marine installations.

Auxiliary air service is maintained by a single three stage air compressor in line with the working cylinders and forward of the compressor is the fuel pump and governor. The construction is heavy and exceptionally rigid. The cylinder heads are bolted directly to the top of the housing. The camshaft is carried in brackets on the side and operates all the valves in the head. An unusually heavy steel forging is used for the crankshaft which is in two parts. Adjustable bearings are used at every important point in the engine as well as at both ends of the connecting rods. Accessibility is provided by means of the large openings in the side of the housing which permits free access to the crankcase. A separate connecting rod and cross-head drive the air compressor from the main crankshaft. This machine is an entirely separate unit distinct from the combination cylinders of the engine. The fuel pump operates with a separate plunger for each of the six cylinders and also drives from the main crankshaft by suitable gearing. A governor which limits the speed of the motor in marine service is also fitted. At the forward end of the engine are located the controls and reversing gear for the directly reversible type. All cylinders are fitted with air starting valves and the motor will turn over by means of air pressure taken from storage tanks. A maximum of 350 pounds is used.

Water jacket spaces are ample to cool all parts of the engine requiring it. The connections and their arrangements are of ample capacity so that a free flow of water can be had throughout. The lubrication is by means of a gravity forced feed system. The oil flows from the gravity tank which is of sufficient height above the crankshaft to give the proper pressure to the main bearings. Wrist pin and crank pin bearings are lubricated by hollow passages in the connecting rod through which the oil is forced. Mechanical oilers are used for the cylinders' exhaust valve stems while minor parts are fitted for hand oiling.

Under test this engine has been forced to develop for a short time some 875 h.p. with only a slight amount of smoking in the exhaust. The fuel consumption has been found to be about 0.52 pounds per horsepower-hour at reduced speed. An overall mechanical efficiency of 80% at full power has also been found. The engine operates smoothly and quietly with an entire absence of vibration.

Twentieth Century Displays Two Models

The exhibit of the **New York Yacht Launch and Engine Co.,** of Morris Heights, New York City, consists of a four cylinder 40-50 h.p. 6½ x8½ 400 r.p.m., and a six-cylinder 6½x8½, 65-75 h.p., 400 r.p.m. 20th Century Motor.

The 20th Century motor has now been on the market for over twenty years, and has made many friends among the yachtsmen. The motor has consistently followed the idea as originally decided on in the way of heavy-duty construction, and the two motors that are on exhibit show the results of consistent application of new ideas as they are developed in the internal combustion motors, retaining those features that have proved themselves with years of service.

This 20th Century motor is an extremely flexible modern machine, and the 1922 models which are on exhibit show a number of improvements, among which are the separate cylinder heads over each cylinder, the use of the exhaust manifold as a heater for the cast inlet which is so essential to the proper carburetion of the present gasoline—the results of this heater being a thorough consumption of the fuel and even distribution of the fuel, and great economy in the fuel. The exhaust valves and inlet valves are mechanically operated and are accessible by means of removable cap over each valve.

There are two sets of ignition plugs, one from the Bosch high tension magneto, and one from the battery by means of single coil and Connecticut distributor. Lubrication is by the pressure system to all bearings, and by separate oil pump box to all cylinders. The bearings that have always been a feature in the 20th Century Motors are retained as formerly.

Representing Many Lines

The space occupied this year by the **Bowler-Holmes & Hecker Co. Inc.,** of New York City, is thirty-five feet in the center of Block K on the Lexington Avenue side of the main floor of the Palace. Here they are exhibiting motors manufactured by the **Stearns Motor Mfg. Co.** of Ludington, Mich., the **Universal Motor Co.,** of Oshkosh, Wis., and the **C. N. Cady Co.** line of two-cycle motors. In addition to these displays, H. E. Holmes, treasurer and general manager of the company, is more or less in charge of the displays of the **Bridgeport Motor Co.,** the **Paragon Gear Works,** the **Hall-Scott Motor Car Co.,** and the **Knox Motor Associates,** as **Bowler, Holmes & Hecker** are the New York representatives for all these motors.

Four New Bosch Plugs

Four new spark plugs are the contribution of the **American Bosch Magneto Corp.,** of Springfield, Mass., to the spring trade. These are a ⅞ inch standard, a ⅞ inch long, a ⅞ inch extra long, and an 18 mm. metric. Although differing in details for various types of motors, they are alike in that they consist of but three principal parts—a heavy central electrode, a large single insulator, and a big, strong steel shell—all built together into a single rugged unit. This construction eliminates threaded joints and prevents leakage of compression and loss of power.

The insulator in Bosch plugs is made of Ambrosite, an almost unbreakable artificial stone. It is impervious to vibration and intense heat, and cannot be punctured by high electric voltage. The electrodes are of nickel alloy, and have knife edges for burning off any oil that may get to them. The shell is made in one piece of high grade steel, and the method of assembling the parts insures a gas-tight plug. Price is $1 each.

These plugs as well as a representative line of American Bosch magnetos are shown in action at the Show.

Richards Shows Several Models

The exhibit of **William Richards,** of New York City, consists of a 12-foot V-bottom tender of rib and batten construction with cedar planking and of bright finish, as well as numerous models of other boats. One-sixth models of the Richards 8-foot V-bottom dinghy and the 16-foot V-botton outboard motor boat give an idea of the construction of these other standardized boats. Models of various sailing craft are shown, as well as fittings for sail and motor boats.

Woolsey Display Unchanged

The **C. A. Woolsey Paint & Color Co.,** of Jersey City, N. J., has made no radical change in the character of its exhibit of other years. The space in Booth 16 is enlivened by display cards featuring Woolsey' products, including a good exhibit of varnishes. The company is featuring as before its high-classs products for boating property, comprising copper paints, yacht whites, marine mixed paints, adamant deck paint, spar and Sparon varnish and heat-resisting engine paints. P. Varley, sales manager, is in charge of the booth, and he and his assistants wll be glad to welcome customers and all those looking for information as to the proper application of paints, varnishes, etc.

Rajah Plugs and Terminals

Rajah spark plugs and terminals are well displayed in the booth of the **Rajah Auto Supply Co.**, of Bloomfield, N. J. The latter consist of the Rajah solderless terminals, which are applied in a few moments without tools and which stay put. The Rajah safety nipple which keeps connections dry and protects against shocks is also shown. The terminals are made in several designs to satisfy individual tastes.

The Pedersen acetylene starting device which will insure positive starting, quickly and in the coldest weather

Properties of Tobin Bronze

For many years the needs of hydraulic and marine engineers for a non-corrosive material from which to build machine parts, exposed to the destructive action of sea water has been filled by Tobin bronze. While this material is a metal the composition of which is not public property, many newer alloys are being prepared to take its place for which many virtues are being claimed. It is a simple matter to produce a metal which will have the same outward appearance as Tobin bronze, without however being possessed of the same characteristics.

The physical properties of the Tobin bronze which cause its marked superiority over these inferior metals can be readily detected by a careful examination of its structure under the microscope. The original Tobin bronze is the product which has been manufactured for the last thirty years by the **American Brass Company** at Ansonia, Conn.

As a result of the remarkable physical properties of this material, it is unsurpassed for all marine purposes. By reason of the special and intricate manufacturing processes in rolling Tobin bronze rods, they are thoroughly worked from the core to the surface and a much finer grained structure results. Similar materials produced under less exacting conditions are unable to meet the same physical tests or stand up under the severe service requirements of salt water conditions. As a result of the uniform hardness and the even distribution of the material, internal stresses are greatly reduced and the possibility of season cracking is very slight. Rods of Tobin bronze can accordingly be finished to meet the physical tests required by practically any engineering specifications.

Under actual service tests, products made from Tobin bronze have shown themselves to be more dependable and reliable than most Naval brasses and the advantages of the bronze are well known to marine and hydraulic engineers who have had the opportunity to make comparisons with other metals in actual installations. By reason of the high tensile strength, toughness, smoothness, resistance to corrosion and season cracking, Tobin bronze is particularly suited to the under water portions of all types of motor boats. Another valuable property of this material is its tendency to resist fouling, and no satisfactory substitute has been found thus far with this feature, which is true only of genuine Tobin bronze.

Fay & Bowen Boats and Engines

The **Fay & Bowen Engine Co.**, of Geneva, N. Y., occupies its usual commanding space with a varied line of boats and four-cycle engines. Of the latter, six models in four and six cylinders are displayed. These comprise the LN-41, a 22 h.p. high-speed motor of four cylinders with dimensions of 3½x4½ inches; the LN-42, a 40 h.p. four-cylinder with 4½x5½-inch cylinders; and the LN-43, another four-cylinder machine developing the same horsepower at a slower r.p.m. These three motors are of the L-head type, and the T-head design is represented by the L-44, a four-cylinder 45 h.p. motor, and the L-63 and L-64, two sixes developing 50 h.p. and 85 h.p. respectively.

The LN-41, first mentioned is a new model on the market for this year, a particularly quiet engine in which a great deal of power for its size has been obtained. The L-64 has been redesigned in certain features with the application of two-point ignition and increase of the horsepower at all speeds.

Of the Fay & Bowen line of runabouts three are shown, the largest being the 27-foot runabout, a round bottom craft with beam and draft of 5 feet 3 inches by 22 inches. It is powered with an LN-42, developing 40 h.p. at 1,400 r.p.m., and develops a speed of 19 m.p.h. The 25-foot Sport model shown is a V-bottom boat powered with an LN-43 50 h.p. and rated at a speed of 23 m.p.h. The third boat shown is the popular Junior runabout, a 24-footer powered with an LN-41 which drives it at a speed of 16 m.p.h.

Grebe and Farley in Partnership

Announcement is made of **Henry C. Grebe & Company, Inc.**, yacht brokers and naval architects. This new Corporation has taken over the yacht brokerage department of the Edward P. Farley Co., and is located at 6 N. Michigan Avenue, Chicago, Ill.

Mr. Grebe, president and general manager, is not a stranger to marine circles, having been associated with the Edward P. Farley Co., for several years. He has had many years' experience in the construction and sale of commercial and pleasure craft. In 1910 he was one of the organizers of the Milwaukee Yacht and Boat Co., which later was taken over and is now known as the Great Lakes Boat Building Corp. In 1914 he came to Chicago and was with the Edward P. Farley Co. until 1917 when he was appointed inspector of hull construction by the Navy Department and was sent to Alexandria, Va., where he had charge of the construction of submarine chasers. Completing this contract he then went with the United States Shipping Board as hull inspector in the Baltimore district. After the Armistice was signed he took charge of the machinery installation of 9,400 ton ships with the Virginia Shipbuilding Corp. at Alexandria, Va. In June, 1920, he came back to Chicago and took charge of the yacht brokerage department of the Edward P. Farley Co.

Mr. Grebe is well known in yachting circles and is also a skillful sailor. The new company's aim is to serve clients always in the best possible way, and to give them the full benefit of many years of wide experience.

Durkee Has Full Line

The exhibit of **Chas. D. Durkee & Co., Inc.**, of New York City, includes a full line of portlights, locks, knobs, and other joiner hardware as well as binnacle steerers, ship telegraphs, propellers, bells, and Crescent anchors. One-two- and three-burner alcohol stoves and ranges are shown, and a new tiller quadrant is displayed which it is thought will meet with the approval of everyone. A feature of the exhibit is the Tvedt adjustable muffler, which is so constructed that it may be adjusted to overcome the variation that is often found in different types and makes of engines. It also reduces the noise from the exhaust without back pressure on the engine.

An Acetylene Engine Starter

A novelty in sure fire engine starting devices is the little acetylene device being manufactured and marketed by **Hermann Pedersen**, the inventor. An ingenious nozzle is made to screw into an opening tapped into the intake manifold in such a way that under normal conditions it remains closed. When the occasion arises to start the motor, a little key on a bottle of compressed acetylene gas is opened ever so slightly and the gas under its high pressure is permitted to flow to the jet of the device. It cannot go further than this point as a needle valve normally remains closed at this point to prevent it. A slight opening is made by means of a throttle attachment which permits the acetylene gas to follow into the manifold. From here it enters the cylinders as the motor is turned over by hand or by means of the electric starter in the usual way. The advantages of the acetylene now become apparent. Instead of an endless turning of a cold motor with no results the dry acetylene gas is in a condition to be fired at once and the motor will start and continue to run after any one cylinder has been turned over the firing position. It has never failed in any cases where it has been installed. In particularly obstinate motors the acetylene valve is held open until the motor picks up its cycle on the normal gasoline fuel. Should it be desired, a slightly different form of nozzle can be fitted which is adapted particularly for continuous running of the motor. The advantages of the use of acetylene gas as a fuel are many. It is claimed that one bottle of compressed gas containing 130 cubic feet of gas is equivalent in energy to 65 gallons of gasoline. The cost and bulk of this material as fuel are so tremendously less than the equivalent volume of gasoline that wonderful results are predicted when the system becomes more generally known. Since the bottles of compressed acetylene are easily secured in practically every city the device will soon be universally adopted on motors of all types. It saves energy in turning a balky motor over, whether hand or electric started. In hand start types it prevents sore hands and bruised fingers and in the electric types it conserves batteries and prolongs their life.

The inventor and manufacturer, H. Pedersen, has established an office at 188 Montague Street, Brooklyn, N. Y., and will be glad to demonstrate the device wherever possible or send information concerning it.

Interesting Tests of Valspar

Across the background of the elaborate booth of **Valentine & Co., of** New York City, are hung three large color panels, which show different effects and colors of Valspar, Valspar enamel and Valspar stain. These panels attract the eye of the observer and call attention to the interesting tests of Valspar which continue during the week of the Show. One of them is the familiar running water machine, consisting of a series of mahogany panels finished with Valspar and other varnishes over which water flows. Under the test Valspar alone does not turn white from the action of the water.

At the front of the booth on the left is a Valspar varnish stain testing machine, consisting of a table top finished in alternate stripes with Valspar mahogany varnish stain and competitive stains. A continuous stream of hot water flows on to the panel from a tilted kettle which is placed over an electric grid.

In the right foreground is a rocking submarine display wherein a copper stamped submarine, baked with black enamel and then varnished with Valspar and other floor and spar varnishes, is immersed in soapy water. The submarine is continually rocked, and the action of the suds proves too much for the endurance of all the varnishes with the exception of Valspar.

Columbian Propellers and Accessories

The **Columbian Bronze Corp.**, of Freeport, L. I., has an extremely interesting exhibit in Block L on the Lexington Avenue side of the Palace, consisting of a number of propellers in rotation as well as other articles of the company's manufacture. The propellers show the various styles designed for high-speed, medium-duty and heavy-duty work and for use in weed-filled waters. One of the particularly interesting features of the exhibit is the Columbian C-Y-C electric generator plant, which is suitably installed for showing off its many advantages.

Two New Sterlings Shown

Two new motors are on display at the exhibit of the **Sterling Engine Co.**, of Buffalo, N. Y., being the Model H and the Little Six, Model K. The former is a large six-cylinder motor developing 300 h.p. ant 1,200 r.p.m., having bore and stroke of 7 by 8½ inches. It is an overhead dual valve motor with removable cylinder sleeves which are inserted in a long tank the full length of the upper crankcase. The crankshaft is four inches in diameter with a large bearing for each cylinder. Following the usual Sterling practice, the motor is completely enclosed, including the flywheel.

The Model K is similar in construction, but has single overhead valves, a 2¾-inch diameter crankshaft, and is rated at 150 h.p. This motor is designed expressly for the Gold Cup class. Both motors are ultra-refined, being built of the best material the market affords, and in design conforming to the conservative Sterling practice.

In addition to the above the Sterling space shows a Model GRS six-cylinder engine, rated at 275 h.p., an exhibition of the Models GH a regular GR-4, 6 and 8 cylinder series, and one of the Model D 12-15 h.p. motors. Most striking of all the displays is the sectional six-cylinder motor mounted on a stand.

Tiebout's Display Comprehensive

The exhibit of **W. & J. Tiebout,** of New York City, includes as far as possible a general summary of this firm's extensive line of marine hardware and supplies. In particular a line of motor boat hardware is on exhibition, as well as a full line of galvanized goods, anchors, windlasses, etc. There are also shown some of the refinements for the larger yachts, such as cabin hardware, lighting fixtures and so on.

At the Blue and Golden Rod Booth

The **New Process Chemical Co., Inc.,** of New York City, has a display similar to that given at the Marine Exposition, featuring Nupro marine glue and ship's paint. A specialty is made of copper paints, hull seam composition and marine glues.

The firm's well-known marine glue, put up in handy stick form, known as Nupro Stop-a-Leak is offered to the public at a special price of fifty cents each during the week of the Show only.

Two Wolverines

In Space K at the Palace the **Wolverine Motor Works, Inc.,** of Bridgeport Conn., is exhibiting two of the well-known line of Wolverine marine engines. One of these is a four-cylinder four-cycle machine which is designed for medium duty service in yachts and develops 35-40 h.p. at 750 to 800 r.p.m. The other motor is a larger type having three cylinders and developing 60 h.p. It is intended for heavy-duty service.

Central Marine Handles Stearns

Of particular interest to motor boatmen in the middle West is the announcement that the **Central Marine Service Corp.,** of Detroit, Mich., has been appointed distributor of the Stearns motor for that part of the United States bordering on the Great Lakes and the middle West in general. The Stearns motor which the Central people represent is manufactured by the **Stearns Motor Mfg. Co.,** of Ludington, Mich. One of the present specialties is a four-cylinder 100 h.p. unit plant with overhead valves, complete with magneto, carbureter, Bosch starting and lighting batteries, etc., which weighs 1,125 pounds and sells for $1,300.

Barker Motor Prices Touch Bottom

Although not named on the list of exhibitors at the Show, Barker two-cycle marine motors are exhibited in the booth of **Topping Brothers,** the New York distributors of these well-known engines. This year the exhibit is made especially interesting because of price reductions announced by the Barker factory at this time which bring the prices of these engines to a level which would have been considered cheap ten years ago.

Besides the fact that these motors are being sold at new low prices it is interesting to note they are being shown not only with the original demountable make and break spark block ignition, but also with a jump spark igniter system built on. The motors are now offered with make and break ignition, with jump spark igniter, or with both systems in double ignition equipment, by which motor may be run with either system independently or by both together.

All-in-One Marine Motor

The **Cleveland Marine Motor Co.,** of Cleveland, Ohio., is introducing to the public a motor of many unique features from which all the disadvantages of the two-cycle motor are claimed to have been eliminated. This is a motor without crankcase compression, and the gasoline consumption is said to be considerably less than in the four-cycle type, due to the large volume of piston displacement. All valves, cams, springs, and other moving parts that are found on a four-cycle motor are eliminated.

This motor is on display at the Show, and one exhibit of particular interest is a motor having a sectional view that explains the operation and advantages of the All-in-One.

Cape Cod Baby Knockabout

One of the most prominent displays in the exhibit of the **Cape Cod Ship Building Corp.,** of Wareham, Mass., is the Cape Cod Baby knockabout, a one-design standardized 18-footer. This boat was designed by Gurney to meet the demand for a well built and safe boat, and one that is especially adapted for boys and girls; yet it is large enough so that grown-ups can derive a great deal of satisfaction from it. The construction is strong yet light, and the rig is of the Marconi type. The hull is fitted with pole mast and stays. The deck, which extends quite well aft is of liberal size around the cockpit. The centerboard is weighted with lead and is iron bound along the bottom and after end, while the rudder is of ample size and shape to steer the boat properly at all times. The beam is five feet, ten inchs, and the depth, amidships is two feet.

Stay-Tite Caulking Cement

The **Fire Equipment & Marine Supply Co.,** of Cleveland, O., manufactures a number of specialties among which the Stay-Tite marine caulking cement occupies a prominent position. Other features of the line are a detachable folding back seat and back rests, electric canoe and motor boat lights, combination post light and an automatic folding seat.

Red Bank Yachts

Two complete boats are on exhibit in Space B-5, taken by the **Red Bank Yacht Works,** of Red Bank, N. J. These are both standardized models, one being a 32-foot Sensible cruiser with a few modified changes for the new year, and the other a 25-foot mahogany runabout of concave V-bottom construction, equipped with a four-cylinder Hall-Scott motor.

The runabout is eligible for the new conditions of the Gold Cup race, and sells complete for $5,750, including the tax. It has a 6-foot beam and is arranged with double cockpits. The cruiser this year is equipped with a Model D-4 Scripps and sells for $4,750 complete, including tax.

Dawn Has New Ways

The **Dawn Boat & Shipbuilding Corp.** of Clason Point, New York City, has been engaged in boat-building over sixteen years, and in this period has completed such successful boats as a mahogany tender for the United States Government which was the former President's private tender, an ambulance boat for St. John's Guild, the mahogany speed day boat Runaway Dot, and the electrically driven yachts Dawn, New Era and Lightnin'. These are a few of the many boats produced at the plant.

During the past few years, the plant has been developed in many ways such as making all machinery independently motor driven, and the shops are efficient and reliable and capable of greater production.

Three electrically operated marine railways are now available for hauling boats up to 100 feet in length for repairs and overhauling, and the facilities for handling boats for storage have been improved and increased so as to provide ample accommodation for boat owners, who demand reliable service.

The corporation is now in position to estimate on and build cruisers and commercial boats from plans submitted, or design craft to meet special requirements. The officers are Ed. Hehre, president, Norman E. Donnelly, vice-president, and George Auer, treasurer.

The Backbone of the Knox

The **Knox Motors Associates** of Springfield, Mass., are showing this year one 40 h.p. Knox motor and one 20 h.p. motor. In conformity with their belief that they can best sell the Knox by the inside rather than the outside they are featuring the backbone around which the Knox is built, thus inviting public inspection to the worth of the engine.

The backbone, so-called, comprises everything from the starting crank ratchet on the front end through to the propeller shaft flange at the after end, including the flywheel, showing the method of bolting it to the crankshaft flange with the thimbles which take the torque and shearing strain from the bolts which hold the flange and flywheel to the crankshaft flange; the crankshaft with the connecting rod and piston reverse gear forward shaft; a sectional reverse gear; reverse gear shaft; reverse gear bearing and thrust bearing together with their housing; and the stuffing box.

The main bearings of the motor are also shown, as well as the camshaft with its bearings, and various other parts.

Even Warm Safety Suits

The **National Life Preserver Co.,** New York City occupies space 73 on the Mezzanine floor where the Ever-Warm Safety-Suit has been a conspicuously interesting sight to the visitors for several years.

The exhibit this year includes life-sized models of the famous life-saving suit in all sizes, for grown-ups and children, for men and women, for boys and girls. Pretty young women also will demonstrate the suits, hold speed tests and participate in other interesting features. There will be a motion picture too, with lively, instructive, interesting scenes.

The suit is shown in detail also, with the patent closure and self-adjusting elastic collar which makes the suit absolutely watertight, and the kapok pads, or lining, which gives it the great buoyancy that enables the wearer to help rescue several other persons. An illustration of the buoyancy, an actual water test, will be carried on throughout the week.

Official records are displayed as well as illustrative proof of the approval by the U. S. Navy, and the suit's use by thousands in the United States and in foreign countries, and data on the lives saved in actual sea disasters.

Johnson Reverse Gears

The **Carlyle Johnson Machine Co.** of Manchester, Conn., is featuring in Block K six sizes of its Model F ball bearing marine reverse gears. Of these the largest is the model 5, recently added to the line. It embodies the familiar details of Johnson clutch design and construction and is designed for maximum duty of 100 h.p. with high-speed motors and 50 h.p. with medium speed. It measures 27 inches overall by 22 inches maximum width and weighs 480 pounds with iron case and 410 pounds with aluminum case.

The Bud-E marine motor is also shown in the 5 h.p. size. This is a two-cycle motor with 3 x 3-inch bore and stroke and two cylinders. It is shown as a unit power plant in connection with one of the smaller Johnson reverse gears.

Elco Features 54-Footer

By far the most interesting of the many attractive exhibits which the **Elco Co.,** of Bayonne, N. J., has ever brought to the Palace is seen this year on the main floor. It comprises four complete boats, of which the largest and most spectacular is a 54-foot twin-screw cruiser. Its hull is of extraordinary size, the internal cubic capacity being one-third greater than is customary in a 54-footer, but its most unusual feature is the splendid deck house. This house is 15 feet long and completely encloses the bridge. It can be opened in pleasant weather or closed completely with windows when conditions are unfavorable. The Elco people have a scheme enabling this boat to be developed in several different arrangements, permitting as many as three staterooms, a bath and a saloon in addition to the deck house. The crew's quarters are in the forecastle. A guaranteed speed of 12 m.p.h. is obtained from the double-screw installation.

Next in size comes the 40-foot Elco cruiser which made a name for itself last season, and in which unusual room for a 40-footer has been obtained. A comfortable speed of 12 m.p.h. together with ready and simple handling is claimed for this boat.

The Elco space would not be complete without the popular 33-foot Cruisette, and this model is shown in all its glory. Last on the list comes the famous 30-foot Elco Express, with which a continued speed of 20 m.p.h. is obtained.

Bearcats and Moto-Rows

Included in the exhibit of the **Belle Isle Boat & Engine Co.,** of Detroit, Mich., is one of the famous Bear Cat runabouts, a standardized product of 25 feet 11 inches length and 6⅓ feet beam which has attracted much interest at motor boat regattas and in all around service. The boat, as shown in space A-5, is equipped wth a Hall-Scott four-cylinder 125 h.p. motor, and shows some interesting hull improvements over the last year's model.

The Davis American dinghies exhibited are of Belle Isle standard design built of natural finished cork pine planking and mahogany trim and seats. These are built in 8, 10; 12, and 14-foot sizes and are equipped for rowing, sail or power. They are all copper fastened and have bronze fittings throughout. They are extremely light for their capacity, and the 8-foot size, which easily accommodates five persons, weighs only 70 pounds.

The Moto-Row is a new model for which Belle Isle has national representation. This is a combination rowing and motor boat of 16-foot length with oak frames and keel and spruce planking. It is equipped with a one-cylinder two-cycle 2 h.p. Gierhoitt motor regularly provided with battery ignition. The battery and coil are enclosed in a weather-proof box, directly under the rear deck, and the entire driving mechanism is compact, taking up little room. Complete and ready to run, the Moto-Row is sold for $250 f.o.b. Marine City, Mich.

Ready for distribution at the Show is a new booklet telling the story of the Bearcat model and copiously illustrated with halftones of this craft. One interesting illustration is the start of the D. A. C. race at Detroit, showing six Bearcats getting away together, and another thriller shows an exciting moment in the Bearcat Circus at Detroit, when seven Bearcats executed maneuvers within a space of about 200 yards square. Moving pictures of this event will be shown at the Palace during Show week.

Smith-Meeker Has Two Displays

The **Smith-Meeker Engineering Co.,** of New York City, is running two exhibits this year, the one under its own name in Space 30 being devoted to the display of a full line of Edison batteries, Winton generators, Homelite generators, and switchboards and radio control boards. The new Autex Reel is featured.

In Space 17, under the name of Homelite, the company is exhibiting its little half kilowatt, air-cooled, direct-connected generating set in operation. Its various features of portability, light weight, and power are displayed, and in connection with it the company shows portable tools and various household utensils operating from the plant.

New Test Room

The **Wisconsin Motor Mfg. Co.,** of Milwaukee, Wis., has recently added a new test room which is entirely electrically equipped. Each test stand has an individual electric motor generator unit. When an engine is completed in the assembly department, it is sent to the test room and connected up with the motor generator which acts as a motor and drives the engine until it is sufficiently free to allow it to be run under its own power. A uniform product is assured as each instrument board is equipped with meters which give the actual power required to drive the engine.

When the engines are sufficiently free, they are started and run under their own power, driving the motor generator as a generator. The load is then gradually increased until the motor develops the required power and then it is run under full load for several hours.

This engine is then picked up with an electric crane of the monorail type, and taken to the final inspecting department, where the motor is completely disassembled and all moving parts are given a thorough inspection and an adjustment, after which the motor is again placed on the test stand and run again for several hours. During this final test a record of the actual performance of the motor is kept, such as the power developed, compression measured, etc., and then if it comes up to the standard it is then ready to be shipped.

All the current that is generated by the generators during tests is reverted into the factory line and used to drive the machinery, giving the benefit of power which otherwise would have been wasted.

Each motor has an individual exhaust pipe leading to the outside of the building. These pipes are underground. A connection is arranged at each test stand for water, gas, and gasoline.

A new experimental laboratory has just been completed. This is equipped with a 300 h.p. Sprague dynamometer so arranged that a motor can be mounted on either end and driven in either direction. Complete equipment has been added for making horsepower and torque curves, fuel economy curves, oil consumption curves, friction horse power curves, etc. This laboratory will be used for experimental work in connection with the improvement of the product.

The Wisconsin engines are represented by several models at the Palace. The exhibit being in charge of T. M. Fenner, Eastern representative.

NWA Vibration Balancing Machine

Since all humanity likes to see things in movement, the exhibit of the **Vibration Specialty Co.** of Philadelphia, Pa., will attract its full share of attention during Show week. This display consists of an NWA combination static and dynamic balancing machine, such as is used in modern factories for the elimination of vibration "periods" in gasoline motors. It is not a machine that the private owner will use, but one which, the inventor asserts, if used in the manufacture of motors, will insure more thorough satisfaction to the owner. G. W. Klinger, engineer of tests, is in charge of the exhibition, and he will be glad to explain to all interested the principles and operation of the balancing machine.

Scout 26-Footer

One of the many interesting standardized cruisers of the present year is the Richardson Scout, a 26-footer built by the **Richardson Boat Co.,** of North Tonawanda, N. Y. This model is a raised-deck affair with large covered cockpit and ample deck room. Below it is capaciously laid out with sleeping accommodations for four persons, and with toilet and galley. The former is placed in the bow of the boat, and the latter occupies the position aft of the berths on the port side. Beneath the bridge is placed the four-cycle 12 h.p. motor with reverse gear which attains for the boat a speed of 9 to 10 miles an hour. The boat is priced at $2,500 complete.

Blood Brothers Leaflet

The **Blood Brothers Machine Co.,** of Allegan, Mich., has just published an interesting leaflet descriptive of its line of universal joints. It describes the functions of a universal joint, and tells when one should be used, while listing also the sizes and capacities of the Blood Brothers' product. These are manufactured in five sizes for various installations, and, described briefly, consist of two yokes flexibly connected by a cross. The cross is made up of two pins passing at right angles to each other through a square center block. This simple and solid connection makes it easy to take the joint apart and reassemble it without the use of tools. The workmanship of the joints is in keeping with their design and the high quality of the materials entering into them. The leaflet is sent upon inquiry from interested persons.

The Burger 36-Footer

A sense of roominess and comfort rarely accomplished in a 50-footer is given in the 36-foot standarized cruiser built by the **Burger Boat Co.,** of Manitowoc, Wis. The attractive craft is arranged with a large cabin forward and a trunk cabin aft with roomy bridge between. To the excellence of design and arrangement has been added a degree of quality in construction and materials that is found only in the products of the best boat builders. It is easy to handle, dependable in operation and is a source of unlimited pleasure to the owner. Designed by Chas. D. Mower, and powered with a Scripps motor, it is ready for immediate and spring deliveries.

Smithson Safety Porthole

A time tried product which has passed through the experimental stage and that through its performance under the most severe conditions on ocean going yachts and steamers, is the safety porthole manufactured by the **Mercantile Specialties Corp.** of New York. It is simple in its mechanical construction having no tumble bolts, nuts, serial gears or pinions to jam, wedge, wear or require attention, to insure proper operation or a watertight joint. Its operation is simplicity itself and no more difficult than opening or closing a door. When closed it is absolutely watertight. It can be inspected at the exhibit of the company in space numbers 31 and 32.

Skaneateles Boats

The greater part of the output of the **Skaneateles Boat & Canoe Co.,** of Skaneateles, N. Y., consists of outboard motor boats and rowboats while next in importance come sailboats and launches of 18 feet or under. The general specifications of the rowboats and outboard motor boats are: keels, stems, and transoms of selected white oak; ribs of red elm; planking ⅞-inch selected white cedar; seats of cedar; decks butternut in lower priced boats, and cherry, black walnut or mahogany in higher priced boats, and the planking is copper fastened throughout.

The Skaneateles outboard motor boats are 16-feet long by 4-feet beam, and have a long, broad bearing on the water. They follow the general rowboat specifications of the concern, but are riveted at the ribs. A wide transom of oak 1¼-inches thick and two strips running along the inside of the bottom of the boat serve to reduce vibration.

Of exactly the same model as the above, but with 2-inch decking on the sides and patent folding centerboard, is the combination camp boat furnished with a leg o'mutton sail of 75 square feet.

The Camper's Delight model, a 16-foot motor boat powered with a 4 h.p. Michigan marine motor, or a one-cylinder Kermath, is a trim little craft with nothing fancy about it. It is good for a speed of about 7 m.p.h. and is ideal for a small party to use for camping or fishing trips. Other popular models of the Skaneateles line include yacht tenders, a 15-foot cat, an 18-foot knockabout, etc.

Spark-C Ignition Tester

The Westinghouse Lamp Co., of New York City, is exhibiting its Spark-C ignition tester for gasoline motors. This is a device wherein flashes appearing at the window of a hard rubber tube indicate the condition of the ignition system. The tube has within it a small glass receptacle filled with neon gas, whose peculiar property is that whenever it is brought into an electric field it glows a light shade of red. Thus if the brass-tipped point of the tube is placed along an ignition cable with defective insulation the tube glows and reveals the spots in the cable where leakage may take place. If it is placed near a spark plug of a motor which is turning over slowly and regular bright flashes occur it shows that the plug is functioning normally. If, however, no flash occurs, it indicates that the plug is not firing. By noting the varying intensity of the flash, near a plug that is operating poorly or spasmodically, the cause of partial failure may be determined. The tester is priced at $1.50.

Harrison Boat Prices Reduced

Of interest to the boat-buying public at this time is the recent announcement of the **R. W. Harrison Boat Works,** of Toledo, O., concerning the reduction in prices of all Harrison boats with the exception of the 32-foot standardized cruisers. The electric starting runabout, a 20-footer, is now priced at $1,400, including war tax as against the old price of $1,625. Similar reductions have been made on the various models of rowboats.

The double-cabin Harrison 32 is an added model for 1922, and it is pronounced by men of experience to be one of the finest cruisers of its size ever produced. The boat is expertly laid out, and the workmanship and materials are of the highest quality.

Yacht Outfitters

Members of yacht clubs, owners of yachts and motor boats, or officers and crew of the largest yacht will find everything required for outfitting themselves at the booth of **B. Schellenberg & Sons,** Space 41, the Brooklyn outfitters.

Nearly seventy years of catering to the comforts of the seafarer both pleasure and commercial assure the wearer of Schellenberg clothing outfits the maximum in fit and style.

The Dauntless Jolly Boat

The principal part of the display of the **Dauntless Shipyard, Inc.** of Essex, Conn., is the 13-foot Dauntless jolly boat, a little all-purpose boat designed in response to the demand for a tender that could carry the limit of load in ship-to-shore errands and yet could be quickly rigged for a fast-sailing sport yacht. The boat is equipped with mast Marconi rigged, detachable steel forestay, boom with jaws detachable, mainsail, jib, rigging, and bronze centerboard, etc. It is framed of white oak and planked in white cedar and all fastenings are of copper or brass.

Other items in the exhibit of this concern are scale models of Essex-built class boats, and boats built on order, with models of the marine railroad, framed illustrations, detailed drawings, etc.

Cory Has Permanent Exhibit

While not represented at the Palace, **Chas. Cory & Sons, Inc.,** of New York City, have a permanent exhibit at 183-7 Varick St. to which all interested in affairs nautical are invited. This consists of a comprehensive display of engine telegraphs, dials, meters, bells, and other instruments used in control of a vessel or motor yacht from bridge to engine-room. On the floor of the exhibit are several models of engine-room telegraphs, surrounding a steering wheel and binnacle. Behind these on a large background are mounted different types of deck lights and standing lights, together with ship telephones, electric warning gongs, pull bells, etc. The various items are all part of the line of ship signalling, communicating, and lighting systems manufactured by Cory.

Baby Doll Conquers Siberian Rivers

When Bender Brothers, operating a Siberian trading schooner out of Seattle, Wash., desired power for a small tender, they decided on the Red Wing Baby Doll Thorobred motor, manufactured by the Red Wing Motor Co., of Red Wing, Minn. The motor, which is a 10-14 h.p. four-cylinder, four-cycle, was installed in this work boat and has surprised its owners with the excellence of its performance.

The Pacific Net & Twine Co. of Seattle, agents for the Red Wing in that vicinity, write the manufacturers that the Baby Doll in the Bender Bros.' boat has worked perfectly throughout the season, towing barges loaded up to fifteen tons up rivers and never gave the slightest sign of trouble. While the Baby Doll is used most in pleasure craft, her performance in Bender Bros.' boat indicates that the little Thorobred is not afraid of work either.

Strombos Opens Show

The Palace show will be opened and closed this year and the noon hour will be sounded each day by the mighty blasts of the Strombos marine horn. This horn will be on exhibit in the booth of the **American Strombos Co.,** of Philadelphia. It is an air horn so constructed that it produces a resounding tone with little expenditure of air. One of its latest features is a universal yoke which greatly facilitates installation.

Boucher Shows Naval History

The **H. E. Boucher Mfg. Co.,** of New York City, is showing in Space 100 a complete line of engines, motor boats, and sail boats in different stages of construction. Directly opposite this firm's space on a wall approximately sixty feet long which was erected for the purpose, it exhibits a series of eighteen models illustrating the history of the U. S. Navy from the earliest vessel—The Bon Homme Richard—up to and including the battle cruisers. The models are on a scale of one-eighth inch to the foot and are part of a group being made for the Navy Department according to plans and information furnished by them.

Deluxe Light Weight Pistons

Deluxe cast iron pistons, made by the **Clark-Turner Piston Co.**, of Los Angeles, Cal., are a product designed to eliminate vibration, reduce gasoline and oil consumption, and increase power range and flexibility. They achieve their light weight by their patented design and not by the use of aluminum or alloys. They consist only of cast iron, but it is iron of a special formula melted and refined in an electric furnace, and their strength is imparted to them by a system of reinforcing ribs in the head which extends the full length of the long skirt. This permits the use of less metal in the Deluxe piston and prevents warping, while the ribs conduct the heat away from the head, down the skirt of the piston, causing the motor to run cooler.

These pistons, because of their light weight, their design and their reinforced construction, have less expansion than either the aluminum alloy or the conventional cast iron piston, permitting a close fit to the cylinder, eliminating piston slap and loss of compression. On the average the Deluxe shows forty to fifty per cent. less weight than the factory cast iron piston.

In the report of a test of a motor fitted with Deluxe pistons the Ohio State University stated "The most noticeable features in the construction of the Deluxe piston are the longer skirt and the high quality of the material and foundry practice in casting. . . The webs aid materially in dissipating the heat, as well as strengthening the walls. The oil-retaining and collecting grooves are well designed, there being not the least sign of oil flooding the combustion chamber nor is there starving of oil on the cylinder walls to cause seizing."

Other points noted in the test and which have been observed also by individual owners are that the use of the pistons greatly reduces vibration and therefore lessens strain and wear on bearings and insures longer engine life, even compression, etc. The pistons are made for a majority of marine engine sizes.

Mullins Steel Boats

One of the most attractive runabouts being built in quantities is the 21-foot V-bottom model manufactured by the **Mullins Body Corp.**, of Salem, O. This runabout, like all other Mullins craft, is a non-sinkable boat built of tough plates of puncture-proof double galvanized steel brought to perfect form. The plates are fastened together by being lapped, countersunk, then securely riveted together and afterwards practically welded by a thorough sweating of a fluxing metal. The water-tight hull is securely braced and strengthened by an interior framework of the best air-dried oak timbers so placed as to lend strength and rigidity to the hull and at the same time support the weight of the power plant. Greater speed and stability are some of the advantages claimed for these craft.

The 21-footer has a beam of 5 feet 6 inches and a draft of 20 inches. The motor, either a 20 hp. Kermath or a 40 hp. Red Wing, is installed forward under a hinged hood. All controls are conveniently grouped on the bulkhead, enabling one person to start and operate the motor from the steersman's seat. The cockpit is 6 feet in length and has a seating capacity of five persons.

Schebler Carburetors

The Wheeler-Schebler Carburetor Co., of Indianapolis, Ind., is showing a complete display of the Schebler carburetor, of which there are the five models, D, L, R, A, and B. Of these one of the most interesting to the owner of smaller boats is the Model B, designed especially for outboard motors and small engines of both the two- and four-cycle types. It is declared to compensate correctly on all small two-cycle motors throughout their entire speed range, and to be suitable for all four-cycle motors taking a ¾-inch carburetor. It has two jets and only one adjustment—a gasoline adjustment, which is entirely automatic after being fitted to the motor. This carburetor retails at $8.75.

An Ice Boat at the Show

In addition to their very complete line of outboard motors and supplementary machinery operated by their little machines the **Evinrude Motor Company** of Milwaukee are displaying in their booth, Block B4, an unusual exhibit. This consists of a full size class F ice boat with 300-square feet of sail. The overall length of this is 31½ feet and the width between runners is 16½ feet. Its weight complete is 900 pounds and its construction is most substantial. Clear spruce of the variety used in aeroplane construction is the principal material used while bronze and aluminum is extensively distributed in the metallic fittings.

Multi-Cone Standard Gear

The Standard Gear Co., of Detroit, Mich., has effected a vital improvement in its reverse gear in the multi-cone clutch which was recently announced to the trade. This new design embodies tremendous friction area at the point of largest diameter of the gear, and the greater friction surface insures gradual engagement, extra holding power, and longer life. The large cones insure strength, durability, and simplicity, and they cannot buckle or warp. As the clutch is used the cones gradually fit into each other, giving even better operation. The gear is of extreme compactness, with the toggle mechanism within the space which is not as efficient for clutch surface. Adjustment is effected from outside the case while the gear is in motion, and the entire mechanism is readily disassembled. The various advantages of the reverse gear are set forth in the company's booth at the show.

Gray Boats at the Show

Gray Boats, of Friendship, Me., are represented in Booth 51 at the Palace with a half model of the 28-foot cruiser produced by this organization, with photographs and blueprints, and also with certain articles of the boat's standard equipment, such as silver, blankets, sheets, dishes, etc.

The Gray is a standardized 28-footer in which the aim has been to produce a real roomy and staunch cruiser which can be taken anywhere at any time. It is built in Maine by Down Easters who have had years of experience in building fishing boats, and it is essentially seaworthy. Full headroom is given in the cabin, which sleeps four. The power plant, installed in a separate compartment, is a Knox 20 h.p. motor, equipped with a Westinghouse starter, Simms magneto, Schebler carburetor, Paragon reverse gear, etc.

An interesting feature of the Gray boat is its equipment which, included in the purchase price, is complete to the last teaspoon and mooring line. A partial list of the items comprising this equipment gives an idea of its comprehensiveness and the unusual attention to detail which the makers of the boat give it. It includes boarding ladder, six life belts, fire extinguishers, fog horn, Pilot Rules, aluminum kitchen utensils, sets of dishes and silverware for six persons, fifty gallons of gasoline in the tanks, fifty pounds of ice, lubricating oil, first aid kit, yacht ensign, etc., etc. When each boat is ready for delivery a suggested list of groceries is sent to the owner and his order is placed aboard at cost.

The Gray is finished in two models, the one a practical man's model, with oak finish and galvanized fittings, being priced with full equipment at $3,350, and the other, the Deluxe model, with mahogany trim and brass fittings selling complete for $3,500. These prices include tax.

Joes Gears

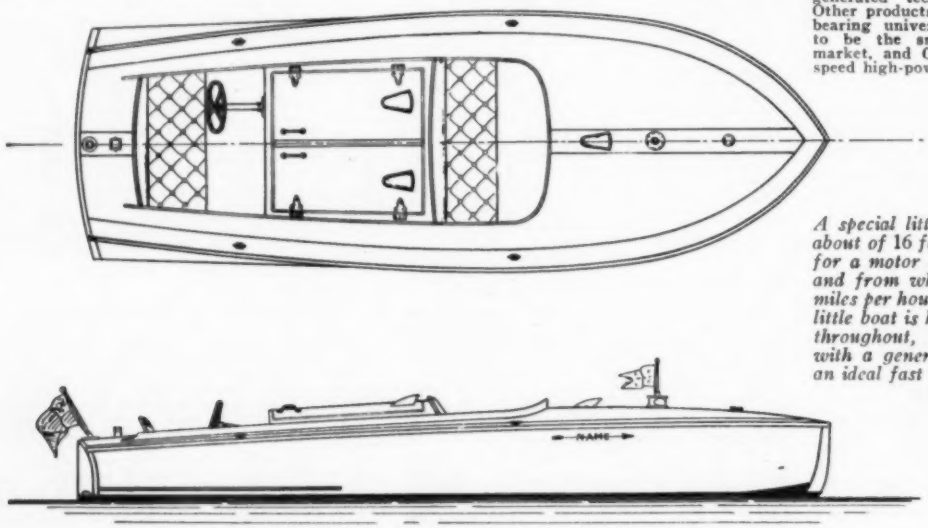
Joes reverse gears, safety rear starter, and one-way clutch are being shown at the Palace by the **Snow & Petrelli Mfg. Co.**, of New Haven, Conn. Joes gears, as motor boatmen know, are made in two types—one for high speed motors and the other, a duplex drive, for heavy duty slow running motors. They are made for all motors from 1 to 350 h.p. and are famous not only because of their steady day-to-day work, but because of their performance with the Misses Detroit, Misses America, and many other famous racing boats.

New Scripps D-2

One of the most attention-attracting small motors of the present Show is the Scripps Model D-2, a two-cylinder motor shown with other models of the line manufactured by the **Scripps Motor Co.**, of Detroit, Mich. Following the same design and appearance of the well-known four- and six-cylinder motors of the D series, it has a bore of 4¼ inches by a stroke of 6 inches. Complete with all necessary fittings, the motor weighs 525 pounds. It is rated conservatively at 10-12 h.p. for medium-duty work, and at 15-18 h.p. when used for semi-speed purposes. The D-2 is a block motor with all moving parts, including the flywheel enclosed. The reverse gear is in unit with the motor, and altogether it is a sturdy, compact job. The cylinders are of the L-head type, with the manifolds on the starboard side, the heat of the exhaust warming the incoming gases. A two-unit starting system is used, the generator being run off an extension of the pump and magneto shaft, and the starter being mounted on the starboard side forward. There is a large crankcase plate on the port side, the cylinder head is removable, and every effort has been made to create a quiet accessible motor.

Cross Gears

Gear boxes for transmitting the power of high-powered racing engines are made by the **Cross Gear & Engine Co.**, of Detroit, Mich., for all types of racing hydros and high class runabouts up to a maximum of 1,000 h.p. and 2,000 r.p.m. They are ball bearing throughout and by reason of this feature and their generated teeth operate unusually quietly. Other products of this concern are Cross ball bearing universal joints, which are declared to be the smallest diameter joint on the market, and Cross reverse gears for all high speed high-powered boats.



A special little high speed runabout of 16 feet length designed for a motor of about 100 H.P. and from which a speed of 40 miles per hour is expected. This little boat is heavily constructed throughout, which combined with a generous flare makes it an ideal fast little sporting runabout

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to attend a continuous exhibition of new and rebuilt marine engines now on display at our showrooms

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These machines have been honestly overhauled in our own shops and are

GUARANTEED

Visit our showrooms, the largest of its kind in the world. It can be made the most interesting feature of your trip.

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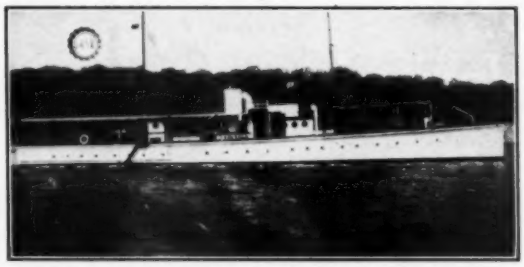
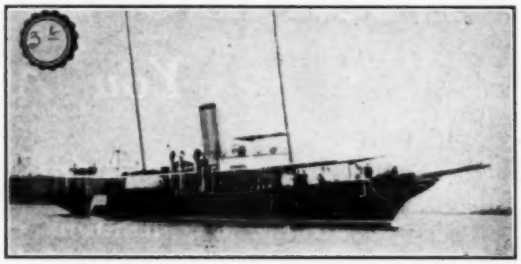
NAVAL ARCHITECTS—MARINE INSURANCE—YACHT BROKERS

15 WILLIAM STREET, NEW YORK

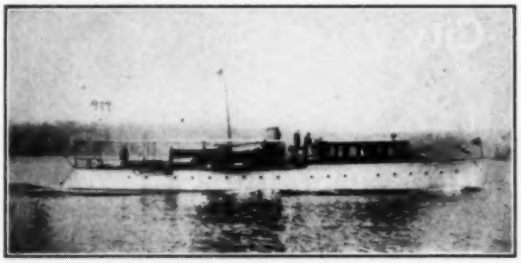
Complete list of all steam and power yachts, auxiliaries and houseboats available FOR SALE and CHARTER. A few are shown on this page. Plans, photographs and full particulars furnished on request.



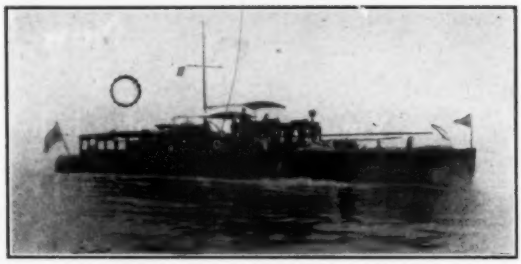
No. 2632—For Sale or Charter—Fast 128 ft. twin-screw cruising power yacht. Speed up to 22 miles. Dining saloon, five staterooms, two bath and toilet rooms. Exceptionally able craft. Cox & Stevens, 15 William Street, New York.



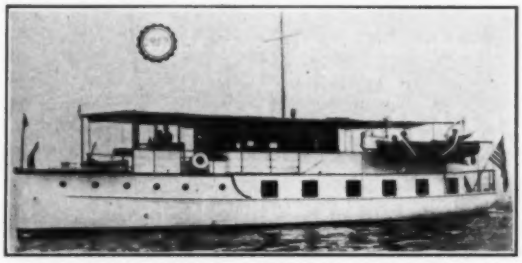
No. 3—For Sale or Charter—Bargain—Attractive 160 ft. steel steam yacht. Excellent accommodation; good speed. First class condition. Cox & Stevens, 15 William Street, New York.



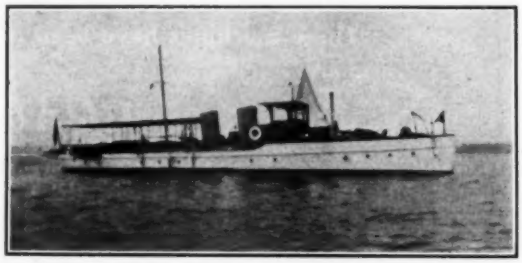
No. 979—For Sale (Might Charter):—Espepcially desirable 98 ft. twin-screw cruising power yacht. Speed up to 16 miles; Standard motors. Deck dining saloon, three double and one single staterooms, two bathrooms, etc. Teakwood deck house and deck trim. Completely overhauled, new furnishings throughout. Price low. Cox & Stevens, 15 William Street, New York.



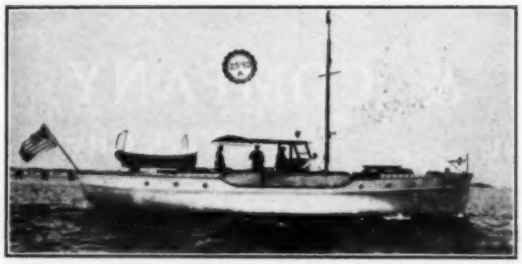
No. 3789—For Sale—Most desirable high speed twin-screw power yacht available. Approximately 88 ft. long. Speed up to 25 miles. Double stateroom, main and dining saloons, bath and toilet room, etc. Large cockpit. Mahogany hull. Price attractive. Cox & Stevens, 15 William Street, New York.



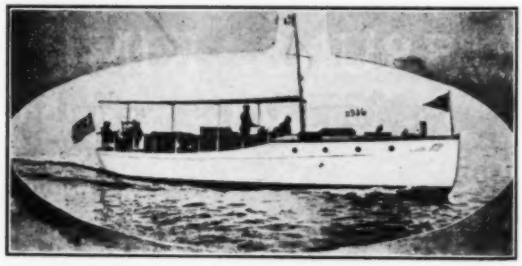
No. 3957—For Sale—Practically new 60 ft. Mathis houseboat. Standard motor. Dining saloon in deckhouse, main saloon, two double and two single staterooms, bathroom and two toilets. Price attractive. Cox & Stevens, 15 William Street, New York.



No. 1997—For Sale—Cruising power yacht; 82 x 12 x 4 ft. Speed 12-14 miles; 6 cyl. 100-120 H.P. "20th Century" motor. Dining saloon, main saloon, one double and two single staterooms, toilet room, galley, etc. In good condition. Price attractive. Cox & Stevens, 15 William Street, New York.



No. 2592—For Sale—Bridge deck cruiser (double end type); 58 ft. 6 in. x 12 ft. x 3.10 ft. Built by Lawley in 1918. Speed up to 12 miles; 6 cyl. Murray & Tregurtha motor new 1921. Large saloon, two double staterooms, two toilet rooms, galley, etc. Delco lighting system. Handsomely finished and furnished. Further particulars from Cox & Stevens, 15 William Street, New York.



No. 2936—For Sale—Elco bridge deck cruiser; 45 x 10.7 x 3.6 ft. Speed 11 miles; 32-37 H.P. Standard motor. Double stateroom, saloon, toilet room, galley, etc. Good deck space. Price very reasonable. Cox & Stevens, 15 William Street, New York.

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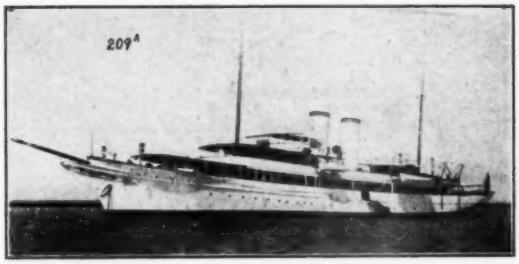
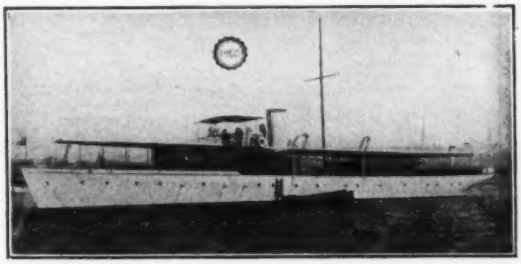
NAVAL ARCHITECTS—MARINE INSURANCE—YACHT BROKERS

15 WILLIAM STREET, NEW YORK

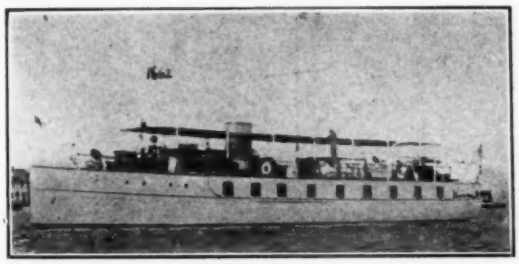
Complete list of all steam and power yachts, auxiliaries and houseboats available FOR SALE and CHARTER. A few are shown on this page. Plans, photographs and full particulars furnished on request.



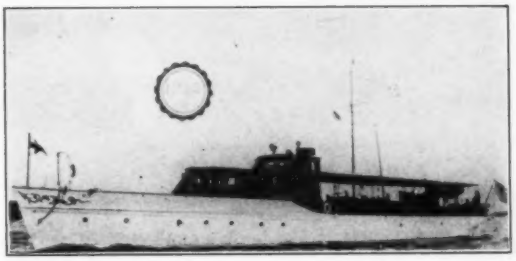
No. 209—For Sale or Charter—Large seagoing steam yacht. Exceptional speed. Roomy accommodation. Completely reconditioned recently. Unusual opportunity. Cox & Stevens, 15 William Street, New York.



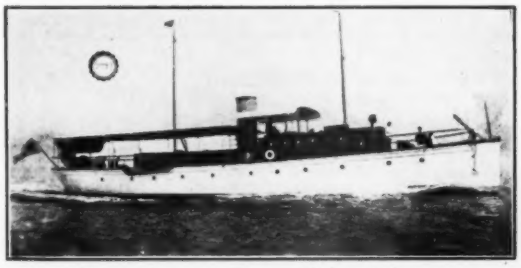
No. 1466—For Sale or Charter—Particularly desirable 140 ft. twin-screw steel cruising power yacht. Speed up to 18 miles. Dining saloon and social hall on deck; 3 double and 1 single staterooms, 3 bath and toilet rooms, etc. Recently overhauled thoroughly at large expense. Cox & Stevens, 15 William Street, New York.



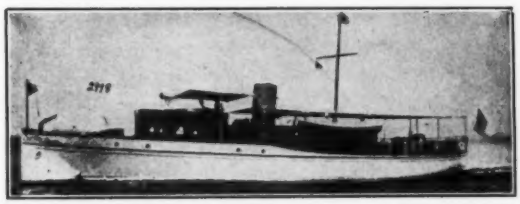
No. 1662—For Sale or Charter—Attractive 90 ft. twin-screw gasoline houseboat; speed 10-12 miles. Large saloon, four staterooms, two bathrooms; all conveniences. Handsomely furnished. Cox & Stevens, 15 William Street, New York.



No. 1230—For sale at low figure—Fast 104 ft. twin-screw cruising power yacht. Speed up to 18 miles; two 6 cyl. 200 H.P. "Speedway" motors. Deck dining saloon, main saloon, two double staterooms, shower bath and two toilet rooms, etc. New furnishings 1920. Further particulars from Cox & Stevens, 15 William Street, New York.



No. 3489—For Sale or Charter—Modern twin-screw power yacht. 90 x 16.3 x 5.2 ft. draught. Speed up to 15 miles; two 115 H.P. Winton motors. Dining saloon in deckhouse forward; two double and one single staterooms; bathroom and two toilets, galley, etc. Unusually large deck space. Price and further particulars from Cox & Stevens, 15 William St., New York.



No. 2978—For Sale—Desirable twin-screw cruising power yacht; 80 x 14 x 4 ft. Speed 13 miles; two 50-60 H.P. Twentieth Century motors new 1919. Dining saloon, two double staterooms, bathroom and two toilets, galley, etc. Recently thoroughly overhauled at large expense. Cox & Stevens, 15 William Street, New York.

No. 3151—For Sale or Charter—Particularly desirable twin-screw houseboat; 77 x 17.6 x 3 ft. Speed 11 miles; two 6 cyl. 60-70 H.P. Standard motors new 1919. Large deckhouse containing social hall; main saloon, two double and two single staterooms, two bath and toilet rooms, etc. Handsomely finished and furnished. Cox & Stevens, 15 William Street, New York.

No. 3477—For Sale—Fast bridge deck cruiser; 43 x 9 x 3.6 ft. Speed up to 17 miles; 130-150 H.P. 6 cyl. Speedway Motor. Saloon, double stateroom, two toilets, galley, etc. Splendid boat for ferry or day service. Price low. Cox & Stevens, 15 William Street, New York.

No. 4048—For Sale—Practically new, handsome, fast, twin screw cruiser; 64 x 12.6 x 3 ft. 6 in. draft. Speed up to 19 miles; two 8 cyl. 175 H.P. Van Blerck motors; electric starters. Enclosed bridge with full motor controls. Dining saloon, two double staterooms, toilet room, galley, etc. Probably roomiest boat of type and size available. Price attractive. Cox & Stevens, 15 William Street, New York.

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MARINE INSURANCE

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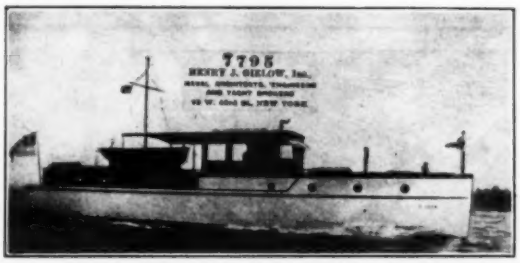
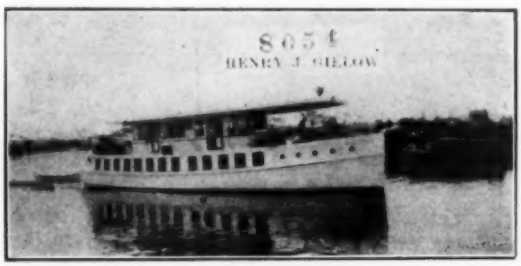
Plans and specifications for new yachts of any size or type should be prepared now to assure delivery for next year. Have plans of new yachts, all types, on file now.

We have a most complete and up-to-date list of steam and motor yachts of all sizes, sail, auxiliary, and houseboats on file in our office, kept constantly up-to-date by a thorough and comprehensive canvass of the entire yachting field from time to time. We are in a position to submit full information on any type of boat upon request.

No. 8037—Now in Florida. Sale or Charter. 62 ft. cruising houseboat. One double and two single staterooms, bathroom. Large deck saloon, all conveniences. Henry J. Gielow, Inc., 25 West 43rd St., New York City.

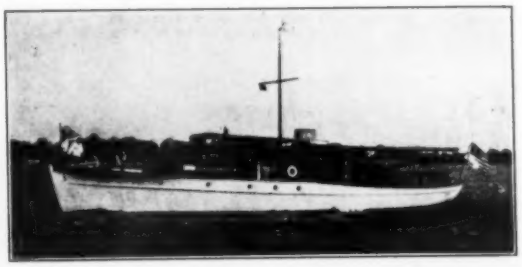


No. 7795—For Sale—45 ft. bridge deck cruiser. Built 1920. Speed 12-14 miles. 100 H.P. Van Blerck motor. One double stateroom, main saloon with 2 Pullman berths, toilet room, galley, etc. Price attractive. Henry J. Gielow, Inc., 25 W. 43rd Street, New York City.

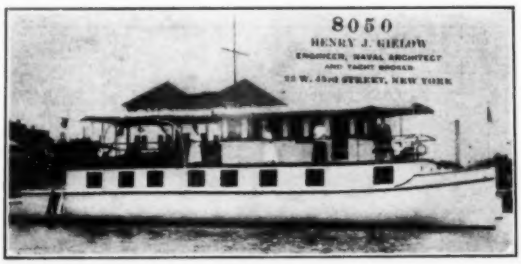


No. 8054—Located in Florida—Sale or Charter—Desirable 66 ft. cruising houseboat. One double and four single staterooms, bathroom. Large deck house containing lounging room. 50 H.P. motor. Henry J. Gielow, Inc., 25 West 43rd St., New York City.

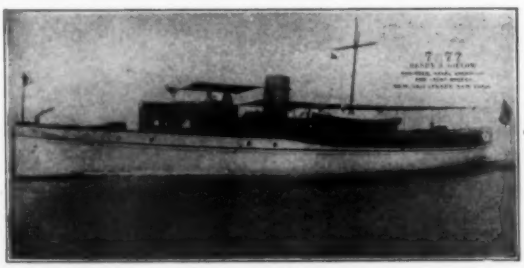
No. 7002—For Sale or Charter—Finest yacht of type available. 138 ft. twin-screw power yacht. Two 300 H.P. Standard engines. Dining room and social hall on deck; three double and one single staterooms; two bathrooms. All furnishings new 1920. Henry J. Gielow, Inc., 25 W. 43rd St., New York City.



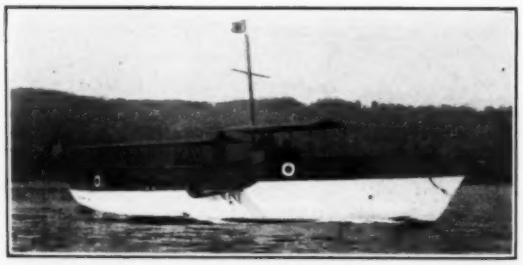
No. 7080—For Sale—Desirable 80 ft. x 14 ft. x 4 ft. 6 in. twin screw power yacht. Speed 13-14 miles. Two double and single staterooms, bathroom, galley, etc. Heated by hot water. Hull and engines thoroughly overhauled 1921. All in first class condition. Inspectable Great Lakes. Henry J. Gielow, Inc., 25 W. 43rd Street, New York City.



No. 8050—For Sale or Charter—Located in Florida. Exceptional roomy 65 ft. cruising houseboat. Three double staterooms, bathroom. Large deck saloon. 50 H.P. motor, speed 10 miles. Henry J. Gielow, Inc., 25 West 43rd St., New York City.



No. 7077—For Sale—Particularly desirable 80-foot twin-screw power yacht. "20th Century" 50-60 H.P. motors, new 1919. Deck dining room, two double staterooms, bathroom. All furnishings and equipment new 1919. Excellent condition. Henry J. Gielow, Inc., 25 W. 43rd St., New York City.



No. 7376—For Sale—61 foot cruising power yacht. Speed 12 miles, 80 H.P. motor new 1920. Delco lighting plant new 1921. Double stateroom, two saloons. Sleeps six. All in first class condition. Henry J. Gielow, Inc., 25 W. 43rd Street, New York City.

Advertising Index will be found on page 192

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YACHT AGENT and SHIP BROKER

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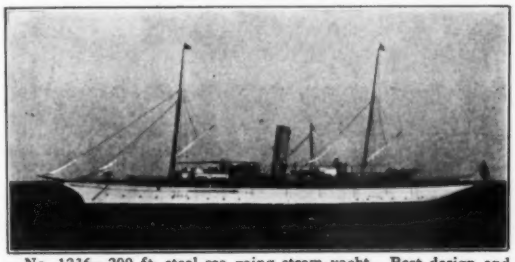
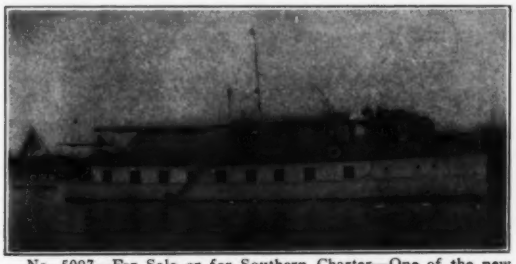
OFFICE NO. 1051

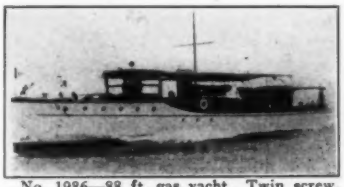
SALES AND CHARTERS—NAVAL ARCHITECTURE—MARINE INSURANCE



No. 1236—200 ft. steel sea going steam yacht. Best design and build. A-1 condition throughout. Oil burning. One of the finest vessels in the fleet. Frank Bowne Jones, Yacht Agent, 25 Broadway, New York.



No. 5097—For Sale or for Southern Charter—One of the new Mathis 80-ft. Power House Yachts. Exceptional accommodations. Frank Bowne Jones, Yacht Agent, 25 Broadway, New York.



No. 1986—88 ft. gas yacht. Twin screw. Good speed. Exceptional opportunity. Frank Bowne Jones, Yacht Agent, 25 Broadway, New York City.

No. 5343—62 ft. twin-screw express cruiser. Designed and built by Lawley. Best cabin arrangement. Frank Bowne Jones, Yacht Agent, 25 Broadway, New York.

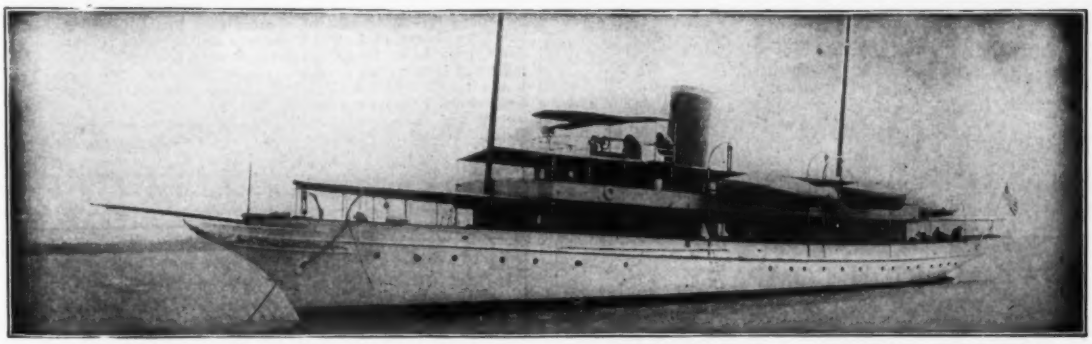
No. 2658—45 ft. Bridge Deck Cruiser—Built 1920—Accommodations include double stateroom and saloon with 2 Pullman berths. Price attractive. Frank Bowne Jones, Yacht Agent, 25 Broadway, New York.

WILLIAM GARDNER & CO.

Naval Architects, Marine Engineers and Yacht Brokers

Telephone Call 8638 Bowling Green **1 Broadway, New York** **Cable Address Yachting, N. Y.**

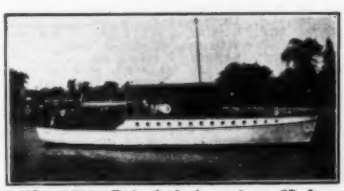
We have a complete list of Yachts of every description for sale and charter **Plans, Photos and full particulars furnished on request.**



No. 659—Steel steam yacht, deep sea type, 187 x 24 x 10 ft. Of best construction throughout, and of recent build from our designs. Promenade deck full width of boat. Has two large deck houses, with chart house and Captain's room on upper deck. Finely appointed owner's and guests' quarters. Was not used in Government Service. In best possible condition and should be seen to be fully appreciated. Inspection invited.

No. 2438—Handsome Express Cruiser, 87 x 12.2 ft.; mahogany planking; two 8 cylinder Speedway motors, speed 20-25 miles. Built under our supervision.

No. 2345—Patrol type. Twin-screw express cruiser, 60 x 10. Two 6 cylinder motors. Speed 25 knots. Very reasonable figure.



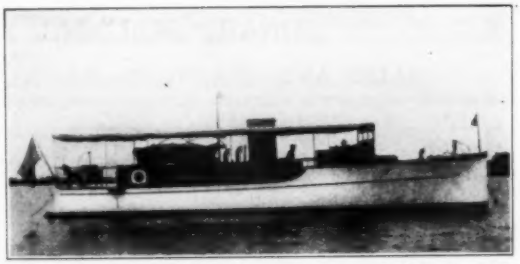
No. 1614—Raised deck cruiser, 57 ft. x 13 ft., Twentieth Century motor, 50 H.P. Three staterooms, saloon, etc. A1 condition.

Telephone Vanderbilt 10499
Suite 401

Marine Insurance

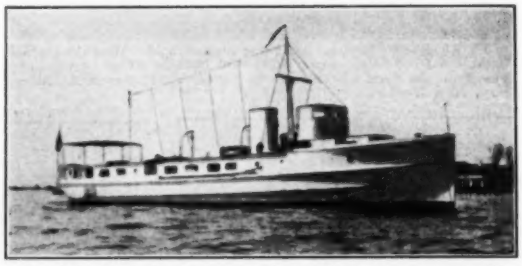
R. M. HADDOCK
NAVAL ARCHITECT and YACHT BROKER
50 East 42nd Street, New York

No. 426—For Sale—43 ft. Bridge Deck "V" Bottom Cruiser. Speed 17 miles. Has saloon and double stateroom, two toilets, galley, etc. 130-150 Speedway engine. Good boat for fast day service. R. M. Haddock, 50 East 42nd St., New York City.



No. 380—For Sale—52 ft. cruiser. Recent build. Has had almost no use since launching and has not been in the Government service. 150 H.P. Speedway engine. Will accommodate six. Apply R. M. Haddock, 50 East 42nd St., New York City.

No. 210—For Sale or Charter: 63 foot Houseboat, now in Florida Waters. 16 ft. beam, 3 ft. 6 in. draft. Two 50 H.P. 20th Century engines. One double and two single staterooms, bath, toilet, etc. Boat in fine condition. R. M. Haddock, 50 East 42nd St., New York City.



No. 316—For Sale: 59 foot Bridge Deck Cruiser, recent build. 70-90 H.P. Sterling engine 1917. A very able boat, economical to run. Price very reasonable. Apply R. M. Haddock, 50 East 42nd St., New York City.

400 HORSE POWER—$1000

To close estate will sell two (2) absolutely new Model MM-12, 400 Horse Power, Van Blerck engines, bronze equipment, complete in every detail at approximately $1000 each. Weight 5000 lbs., are suitable for speed cruiser or fast day boat. First reasonable offer takes them. Room 706, 25 West 45th Street, New York.

For Sale

Very attractive twin screw V-Bottom express cruiser, Hand design, new last season. Length 55 ft., beam 11 ft., draft 2 ft. 9 in. Two 6 cyl. Van Blerck motors, Delco lighting set, speed better than 25 m.p.h. Deck houses and all interior woodwork handsomely finished in mahogany. The accommodations forward consist of a cabin with berths for four, toilet room and large closets, next aft is a spacious well-equipped galley. The engine room is amidships between water-tight steel bulkheads; two pipe berths, toilet and lavatory are provided here for the crew. The owner's room is next aft with a wide spring berth and transom, splendid toilet room and large closet. The roomy cockpit provides for a large party and the protection and cosiness of the enclosed bridge must be seen to be appreciated. White cedar and mahogany tender and full inventory included.

Inspectable near Boston. B. T. Dobson, Naval Architect, Yacht Broker, New Bedford, Mass.

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ALL ENGINES THOROUGHLY REBUILT UNLESS OTHERWISE SPECIFIED

275	80	H.P.	Wolverine, 3 cyl. 4 cyc. propeller & rev. gear	2000.00
277	16	H.P.	Lathrop, 2 cyl. 2 cyc.	285.00
299	24	H.P.	Lathrop, 2 cyl. 2 cyc. no rev. gear	350.00
302	5	H.P.	Wolverine, with rev. gear	175.00
312	20	H.P.	Lathrop, 2 cyl. 2 cyc.	380.00
329	24	H.P.	Lamb, 4 cyl. 4 cyc. with rev. gear	449.00
354	100	H.P.	Fairbanks-Morse C. O. 4 cyl. new, with propeller equipment	5500.00
355	35-40	H.P.	Scripps, 4 cyl. 4 cyc. elect. starter and mag., as is..	650.00
357	135	H.P.	Van Blerck, electric starter and magneto, as is....	750.00
358	11	H.P.	Ferro, 2 cyl. 2 cyc. reverse and prop., as is.....	165.00
360	20	H.P.	Buffalo, 4 cyl. 4 cyc. reverse gear, magneto, shaft and prop., as is, good running order	400.00
361	75	H.P.	Friable, 6 cyl. 4 cyc., reverse gear	800.00
363	5	H.P.	Mianus, 1 cyl. 2 cyc.	65.00

Troseholm Fuel Vaporizers for using kerosene fuel on 4 cycle engines. Vaporizer circular on request.

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Advertising Index will be found on page 192

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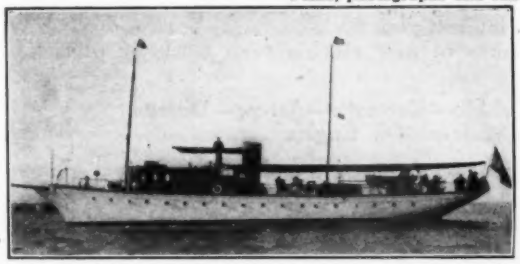
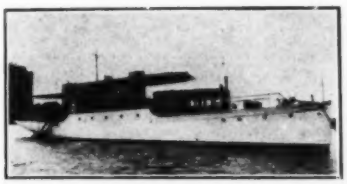
NAVAL ARCHITECTS. SURVEYING. MARINE INSURANCE.

We have a complete list of all steam and power yachts, auxiliaries, and houseboats, which are offered for sale and charter. Plans, photographs and full particulars furnished on request.

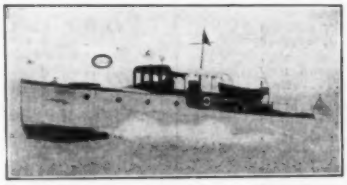


No. 36.—For Sale—Twin screw power yacht. 98 ft. x 16 ft. 6 in. x 4 ft. draft. Five staterooms, two baths. Deck dining saloon. Winton motors. In excellent condition. Henry C. Grebe & Co., Inc., 6 North Michigan Ave., Chicago, Ill.

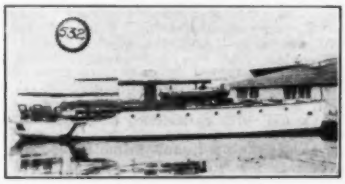
No. 941—For Sale or Charter—Attractive twin screw houseboat. 85 ft. x 19 ft. x 3 ft. 20th Century engine. Conveniently arranged. Large deck saloon. Five staterooms, three bathrooms. Handsomely furnished. Henry C. Grebe & Co., Inc., 6 North Michigan Ave., Chicago, Ill.



No. 38—For Sale—78 ft. Lawley built cruiser. Winton motor. Two commodious double staterooms. Two toilets. Dining saloon in deckhouse forward. A very able and modern boat. Henry C. Grebe & Co., Inc., 6 North Michigan Ave., Chicago, Ill.



No. 1018—For Sale—54 ft. twin screw express cruiser. Speed 20-25 miles per hour. Double stateroom and large main saloon. Two toilets and shower bath. Well equipped and in excellent condition. Henry C. Grebe & Co., Inc., 6 North Michigan Ave., Chicago, Ill.

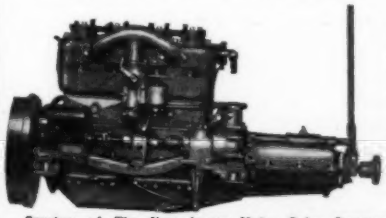


No. 532 — For Sale — 71 ft. twin-screw flush deck motor yacht. Built by Seabury. Motors controlled from deck. Accommodations consist of one double stateroom, large main saloon, bath, etc. Attractive price. Located Great Lakes. Henry C. Grebe & Co., Inc., 6 North Michigan Ave., Chicago, Ill.

THE JOHNSON MARINE REVERSE GEAR

AS USED ON THE N. J. M. MOTOR

Shown here in our No. 1A size in their special case design. A neat, trim and compact arrangement.



Write for Catalog No. 25 of standard Model "F" Ball Bearing Gears up to 100 H. P. capacity. See our exhibit, Block "K," National Motor Boat Show, New York City.

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NO CAULKING OR SEAM FILLING

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ELASTIC SEAM COMPOSITION TRADE MARK

Used by the Government and by most Steamship and Yacht Builders and by Amateur Builders.

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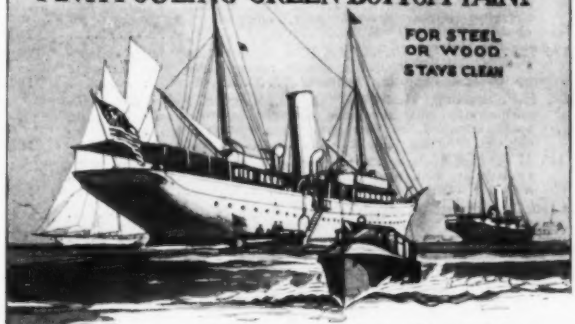
FOR STEEL OR WOOD
STAYS CLEAN



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Increases speed, saves fuel and large expense bills. A hard and peculiar slippery finish which lasts a long time. It pays for itself many times over by eliminating costly repairs, scraping and repainting work. It is a powerful wood preservative and anti-fouler, and is equalled only by Copper Sheathing as a protection against Teredos.

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Advice and consultation free on all painting and repair work.

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ALMOST all of the motors listed below, unless marked "AS IS" have been honestly and thoroughly rebuilt in our own shops and are covered by our IRON-CLAD GUARANTEE. They represent substantial savings on the prices of new machines and will give practically the same service and satisfaction.

Ask for further description of whatever sizes interest you.

We are also distributors for the following makes of new machines—a stock of which is always on hand:

Sterling—Regal—Murray & Tregurtha—Frisbie—Kermath—Arrow—Doman —Wolverine—Peerless—Missouri Oil Engine

We will take your present engine as part payment on a new one and make a liberal allowance for it.

QUOTATIONS ON OUR REBUILT MOTORS ARE SUBJECT TO PRIOR SALE. WE THEREFORE REQUEST THAT YOU WIRE US TO HOLD FOR YOU THE MOTOR WHICH YOU SELECT, FOLLOWING WITH DEPOSIT BY FIRST MAIL. THERE WILL BE A NOMINAL CHARGE MADE FOR CRATING, ACCORDING TO THE SIZE OF THE ENGINE.

Description	Price
Twin 300 H.P. Sterling, Model "F," 8 cyl., 4 cycle, 6¼ x 9, with carburetors, coil, magneto, electric starter attached, reverse gear, etc.; complete up to and including flange coupling; one year guarantee same as that given with a brand new Sterling .....each	$6500
250 H.P. Sterling, latest type, Model R, 8 cyl., valve in head, 5½ x 6¾ with carburetor, coil, ignition system, complete oiling system, all latest type electric starter and generator, etc.; complete up to and including coupling.....	2400
250 H.P. Van Blerck, 12 cyl., 4 cycle, 5½ x 6, with two Bosch magnetos, two Schebler carburetors, reverse gear, etc., complete up to and including coupling.....	2500
225 H.P. G.R. Sterling, 6 cyl., 5¾ x 6¾, late over-head dual valve type, practically equal to brand new with carburetor, coil, complete ignition, electric starter, reverse gear, etc.; complete up to and including coupling, one year guarantee	3000
Twin 200 H.P. Sterling, 8 cyl., 5½ x 6¾, Model "F," with carburetors, coil, magneto, electric self-starting outfit, reverse gear, etc.; complete up to and including coupling....each	2950
Two 200 H.P. Sterling engines, 8 cyl., 4 cycle, 8¼ x 10, Model D, heavy duty, with magnetos, coils, reverse gear, etc., brand new. Can be fitted to operate on kerosene.....each	6800
Two pair Twin 162-215 H.P. each, Van Blerck, Model "J," 8 cyl., 6 x 6, complete with electric starting and charging outfit, magnetos, carburetors, etc., complete up to and including couplings; practically brand new condition.....each Per pair	1500 2800
152-200 H.P. Van Blerck, 8 cyl., Model "8M," 1919, 5¾ x 6, all complete with carburetor, coil, electric starting and charging outfit, reverse gear, complete up to and including coupling	2600
135-170 H.P., each Van Blerck, 5½ x 6, Model "E-8," with electric starter, carburetor, coil, magneto, reverse gear, etc.; complete up to and including coupling.....	1800
135 H.P. Sterling, Model "R," 6 cyl., 4 cycle, 5½ x 6¾, with carburetor, coil, magneto, electric starting and charging outfit attached, reverse gear, etc., complete up to and including coupling	1875
135 H.P. Model R Sterling, 6 cyl., 4 cycle, 5½ x 6¾ with carburetor, coil, magneto, reverse gear, etc.; complete up to and including coupling.....	1600
Twin 110 H.P. Sterlings, Model "F-6," 6 cyl., 4 cycle, 5½ x 6¾, with carburetors, coils, magnetos, electric self-starting outfits, reverse gears, etc.; complete up to and including couplings, 1 year guarantee.....each For the pair.....	2400 4500
100 H.P. Sterling, Model "B," 8 cyl., 4 cycle, 5½ x 6, with carburetor, coil, spark plugs, reverse gear, etc.; complete up to and including coupling.....	1500
100 H.P. Twentieth Century, 6 cyl., 4 cycle, 8 x 10, heavy duty, 325 R.P.M., with reverse gear, carburetor, coil, magneto, air starter, etc., complete up to and including coupling, ready for quick shipment.....	3000
90-100 H.P. Globe, heavy duty, 4 cyl., 4 cycle, 9½ x 14, with carburetor, coil and reverse gear, AS IS.....	1000
Twin 90 H.P. Craig, 4 cyl., 4 cycle, heavy duty, 9 x 10, complete with carburetors, coils, magnetos, reverse gears, etc.; complete up to coupling; for the pair..... For one engine.....	4000 2200
90 H.P. Wisconsin, 6 cyl., 5¾ x 7, with carburetor, coil, magneto, etc., complete up to and including coupling, just been rebuilt in Wisconsin's own factory.....	1575
90 H.P. Matheson, 4 cyl., 4 cycle, with carburetor, coil, spark plugs, splendid condition, AS IS.....	250
75-100 H.P. Sterling, 4 cyl., 4 cycle, 5½ x 6¾, Model "F," complete with electric starting and charging outfit, carburetor, coil, magneto, spark plugs, oiling system, reverse gear, etc.; complete up to and including coupling, all rebuilt ready for immediate delivery, one year guarantee.....	1800
75-80 H.P. Winton, 6 cyl., 6½ x 9, Model "W-6," with carburetor, coil, magneto, reverse gear, etc.; complete up to and including coupling, self starter attached.....	3800
75 H.P. Craig, 800 R.P.M., 4 cyl., 4 cycle, 1500 lbs., 6½ x 7, with carburetor, coil, reverse gear, etc.; complete up to and including coupling	$900
75 H.P. Frisbie, 6 cyl., 6 x 6, complete with carburetor, magneto, spark plugs, reverse gear and coupling.....	1500
Twin 70-90 H.P. each Sterling, heavy duty, 6 cyl., 4 cycle, 6½ x 9, late type, with carburetors, coils, magnetos, mechanical oilers, spark plugs, air pumps, reverse gears, etc.; complete up to and including coupling, one year guarantee, complete with electric self-starter and generator.....each For the pair.....	3400 6000
65 H.P. Scripps, 6 cyl., 4 cycle, 5½ x 6, with carburetor, coil, spark plugs, Bosch magneto, reverse gear, etc., complete up to and including coupling.....	1200
65 H.P. American-British, 6 cyl., 5 x 5½, complete with carburetor, coil, spark plugs, Bosch magneto, reverse gear and coupling	850
Twin 60-85 H.P. Murray & Tregurtha engines, 6 cyl., 6½ x 8, with carburetors, coils, high tension magnetos, reverse gears, etc.; recently overhauled by makers.....each For the pair.....	2200 4000
60-70 H.P. Wisconsin, type GM, 1921 model, used about 300 miles only, 6 cyl., 4 cycle, 4¾ x 5½, with German Bosch Z.R. dual two point magneto and coil, latest Stromberg carburetor, spark plugs, electric self-starting and charging outfit, storage battery, reverse gear, etc.; complete up to and including coupling, manufacturer's one year guarantee until May 1922, all in perfect order, guaranteed	1500
60-70 H.P. Truscott, 6 cyl., 4 cycle, 7 x 9 overhead valve type, with carburetor, coil, high tension magneto, reverse gear, etc.; complete up to and including coupling.....	1400
60 H.P. Loew-Victor, 6 cyl., 4 cycle, 4¾ x 5½, with carburetor, coil, electric starting and charging outfit, attached, reverse gear, etc.; complete up to and including coupling	1250
60 H.P. Lamb, 6 cyl., 4 cycle, 6¾ x 7, carburetor, coil, magneto, reverse gear.....	1800
Two 60 H.P. Sterlings, 6 cyl., 6½ x 8, with high tension Bosch dual magneto, carburetor, coil, reverse gear; complete back to and including coupling.....each	2850
50-85 H.P. Sterling, Model "B," 6 cyl., 4 cycle, 5½ x 6¾; with electric self-starting outfit, Schebler carburetor, Bosch dual magneto and coil, spark plugs, wiring, reverse gear, etc.; complete up to and including coupling, one year guarantee	2400
50-65 H.P. Hall, 4 cyl., 4 cycle, 7½ x 10, heavy duty, with carburetor, coil, magneto, reverse gear, etc., complete up to and including coupling.....	2000
50 H.P. Sterling, Model R, 4 cyl., 4 cycle, 4¾ x 5½, with carburetor, coil, magneto, spark plugs, reverse gear, etc.; complete up to and including coupling; one year guarantee	1000
Two 50 H.P. Hitchcock, 4 cyl., 4 cycle, 7½ x 9, with carburetor, coil, reverse gear, AS IS.....each	800
50 H.P. Automatic, 4 cyl., 4 cycle, 7½ x 9, with carburetor, coil, magneto, reverse gear, AS IS.....	800
48 H.P. Barber, 6½ x 6½, complete with coil, carburetor, coupling, spark plugs, AS IS.....	250
Twin 40-50 H.P. Knox, heavy duty, 4 cyl., 4 cycle, 7 x 8, with magnetos, coils, carburetors, reverse gears, etc.; complete up to and including couplings. For the pair..... For one engine.....	2500 1400
40-50 H.P. Hall, 6 cyl., 4 cycle, 5½ x 6¼, carburetor, Bosch magneto, coil, reverse gear.....	1400
40-50 H.P. Anderson, 6 cyl., 4 cycle, 5 x 6, complete with carburetor, coil, spark plugs, magneto, rear starter, reverse gear, etc.; complete up to and including coupling.....	1250
Twin 40 H.P. Lamb, Model "R," 6 cyl., 4 cycle, 5¾ x 6, weight 1650 lbs., each, with Bosch magnetos, coils, carburetors, reverse gears, etc.; complete up to and including couplings. For the pair..... For one engine.....	2500 1400

Advertising Index will be found on page 192

Description	Price
40 H.P. Sterling, heavy duty, 4 cyl., 4 cycle, 6½ x 8, complete with carburetor, coil, reverse gear, Bosch magneto, etc.; complete up to and including coupling; with one year guarantee	$2000
40 H.P. Roberts, 4 cyl., 2 cycle, with carburetor, coil and coupling, AS IS	165
40 H.P. Ajax, 4 cyl., with carburetor, coil, magneto, reverse gear, AS IS	200
40 H.P. Speedway, 4 cyl., 4 cycle, 6 x 6, with carburetor, coil, Atwater Kent, distributor, spark plugs, reverse gear, etc.; complete up to and including coupling	950
Twin 35-85 H.P. Sterlings, Model "FH," heavy duty, 6 cyl., 5½ x 6¾, all enclosed type, with electric starting and charging outfits, carburetors, coils, spark plugs, wiring, reverse gears, etc.; complete up to and including coupling, one year guarantee ..... each For the pair	2400 4500
35-55 H.P. Sterling, 4 cyl., 4 cycle, 5½ x 6¾, with carburetor, coil, magneto, electric starter, reverse gear, etc., complete up to and including coupling, one year guarantee	1600
Two 32-37 H.P. Standard, 4 cyl., 4 cycle, 6 x 8, carburetor, coil magneto, reverse gear ..... each	1400
30-40 H.P. Brown, 4 cyl., 2 cycle, coil, carburetor and spark plugs, AS IS	250
30-40 H.P. Grant Ferris, 4 cyl., 4 cycle, 6 x 6, with carburetor, coil, Atwater Kent ignition and reverse gear	750
30-40 H.P. Van Blerck, 4 cyl., 4 cycle, 5 x 6, with carburetor, coil, magneto, Paragon reverse gear, complete up to and including coupling	750
30-35 H.P. Eddystone-Globe, 6 cyl., 2 cycle, with two Schebler carburetors, coil, Atwater Kent distributor, Baldridge reverse gear and coupling, AS IS	350
30 H.P. Kennebec, 3 cyl., 2 cycle, with carburetor and coil, AS IS	100
28 H.P. Murray & Tregurtha, 3 cyl., 4 cycle, 6½ x 8, with carburetor, coil, magneto, reverse gear	1000
Twin 25-37 H.P. Craigs, 4 cyl., 4 cycle, valve-in-head, heavy duty, 6 x 7, with carburetor, coil, magneto, reverse gear, air pumps, etc., complete up to and including coupling....each For the pair	975 1800
25-35 H.P. Peerless, 4 cyl., 4 cycle, 5 x 6, with Atwater Kent ignition, carburetor, coil, spark plugs, reverse gear, etc.; complete up to and including coupling	595
25 H.P. Tuttle, 2 cyl., 2 cycle, with coil, carburetor, spark plugs, etc.; complete up to and including coupling, AS IS	125
24-27 H.P. Standard, 3 cyl., 4 cycle, 6 x 8, with carburetor, coil, magneto, reverse gear, etc., complete up to and including coupling, brand new cylinders	1100
24 H.P. Fairbanks-Morse, 4 cyl., 2 cycle, complete with carburetor, timer, coil and coupling, AS IS	250
Two 20-35 H.P. Sterling, 4 cyl., 4 cycle, 4⅜ x 5½, late models, with carburetors, coils, Bosch magnetos attached, reverse gear, etc.; complete up to and including coupling; one year guarantee	875
20-30 H.P. Doman, 4 cyl., 4 cycle, 5 x 6, completely rebuilt and retested in Doman factory, with carburetor, coil, magneto, reverse gear, etc., complete up to and including coupling	575
Two 20-24 H.P. Gray, 2 cyl., 2 cycle, with carburetor, coil, spark plugs, etc.; complete up to and including coupling, AS IS each	150
Two 20 H.P. Relaco, 4 cyl., 4 cycle, 4 x 6, with carburetor, coil, reverse gear, etc.; complete up to coupling ..... each	675
20 H.P. Twentieth Century, 4 cyl., 4 cycle, 5¼ x 7¼, Bosch magneto, reverse gear, etc.	975
20 H.P. Mianus, 2 cyl., 2 cycle, heavy duty, with two carburetors, coil, oiling system, reverse gear, etc.; complete up to and including coupling, AS IS	300
Three 18-25 H.P. Sterlings, 4 cyl., 4 cycle, 4⅜ x 5½, with Schebler carburetors, coils, Bosch magnetos, reverse gears, etc., complete up to and including coupling, one year guarantee..each	875
18 H.P. Lackawanna, 3 cyl., 2 cycle, with three carburetors, coil, timer, and coupling, AS IS	110
18 H.P. 20th Century, 3 cyl., complete with carburetor, coil, magneto, reverse gear, M. & B. ignition and coupling	675
17-25 Sterling, Model "E-2," 4 cyl., complete with carburetor, coil, magneto, reverse gear, coupling and electric starting equipment	950
17-25 H.P. Sterling, Model E-1, 4 cyl., 4 cycle, with carburetor, coil, magneto, built in reverse gear, etc.; complete up to and including coupling; guaranteed for one year	750
17 H.P. Fairbanks-Morse, 3 cyl., 2 cycle, with carburetor, coil, magneto, spark plugs and coupling, AS IS	135
16-18 H.P. Lackawanna, 2 cyl., 2 cycle, with carburetor, coil, spark plugs, AS IS	125
16-18 H.P. Standard, 2 cyl., 4 cycle, with carburetor, coil, ignition, reverse gear, complete including coupling	$600
15 H.P. Fulton, 2 cyl., 2 cycle, with carburetor, ignition, etc., complete up to and including coupling, AS IS	160
15 H.P. Royal, 2 cyl., 2 cycle, with carburetor, coil, reverse gear, etc., to coupling; AS IS	150
15 H.P. Eagle, Model "2-E," 6 x 6½, with reverse gear, muffler, two Schebler carburetors, spark plugs, coil etc.; up to and including coupling	350
15 H.P. Knox, 2 cyl., 2 cycle, with carburetor, coil, reverse gear, etc.; complete up to and including coupling, AS IS	$195
15 H.P. Lamb, 2 cyl., 4 cycle, with carburetor, coil, reverse gear, magneto, oiling system, spark plugs, etc.; complete up to and including coupling	350
15 H.P. Mianus, 2 cyl., 2 cycle, with carburetor, coil and coupling, AS IS	150
14 H.P. Mohawk, 2 cyl., 2 cycle, with carburetor and coupling, AS IS	110
12-15 H.P. Sterling, Model "C," 2 cyl., 4 cycle, 5½ x 7, with carburetor, coil, spark plugs, magneto, mechanical oiler, reverse gear, etc.; complete up to and including coupling, brand new cylinders on this engine, one year guarantee	550
Three 12-15 H.P. Sterling, Model D, 2 cyl., 4 cycle, 5½ x 7, heavy duty late model, with carburetor, coil magneto, reverse gear, etc.; complete up to and including coupling, very little used	600
12 H.P. Kermath, with separate reverse gear and complete with high tension magneto, carburetor, spark plugs, etc.; complete up to and including coupling	330
12 H.P. Barber, 2 cyl., 2 cycle, with carburetor, coil, AS IS	135
11 H.P. Ferro, 2 cyl., 2 cycle, with carburetor, coil, spark plugs, and oiling system, AS IS	110
11 H.P. Lackawanna, 2 cyl., 2 cycle, with carburetor, coil, spark plugs; AS IS	75
11 H.P. Essex, 2 cyl., 2 cycle, with carburetor and coil, AS IS	95
10 H.P. Gray, 2 cyl., 4 cycle, with magneto, carburetor and coupling only, in good shape, AS IS	135
10 H.P. Fulton, 2 cyl., 2 cycle, with carburetor, coil, and ignition, AS IS	110
10 H.P. Otto, 2 cyl, 4 cycle, carburetor, coil, AS IS	150
10 H.P. Sterling Kid, 4 cyl., 4 cycle, 2⅝ x 4½, with carburetor, coil, magneto, oiling system, spark plugs, wiring, reverse gear, etc.; complete up to and including coupling	500
10 H.P. Relaco, 2 cyl., 4 cycle, complete with carburetor, coil, magneto, switch, reverse gear and coupling	375
10 H.P. Hubbard, 1 cyl., 2 cycle, with coil and coupling only, AS IS	95
8 H.P. Royal, 1 cyl., 2 cycle, with carburetor, coil and coupling, AS IS	90
8 H.P. Eagle, 2 cyl., 4 cycle, with carburetor, coil, reverse gear, complete up to and including coupling, AS IS	120
7-9 H.P. Bridgeport, 2 cyl., 2 cycle, with carburetor, coil and coupling, AS IS	150
7½ H.P. Buffalo, 2 cyl., 4 cycle, with carburetor, coil, spark plugs, reverse gear, etc.; complete up to and including coupling	295
7½ H.P. Hartford, single cyl., 2 cycle, with carburetor, coil, and coupling, AS IS	100
7 H.P. Lathrop, single cyl., 2 cycle, with carburetor, coil, and coupling, AS IS	75
7 H.P. Fairfield, carburetor, coil, muffler and coupling, AS IS	55
7 H.P. Fulton, 2 cyl., 2 cycle, with carburetor, Perfex waterproof ignition, AS IS	100
6 H.P. Lathrop, 1 cyl., 2 cycle, with carburetor, coil and spark plug, AS IS	95
6 H.P. Mianus, 1 cyl., 2 cycle, with carburetor, coil and coupling, AS IS	85
6 H.P. Mianus, 2 cyl., 2 cycle, overhauled by the Mianus Company, with two Schebler carburetors, coil, oil cups, etc., complete up to coupling, AS IS	125
5-6 H.P. Palmer, 1 cyl., 4 cycle, 5 x 6, with carburetor, coil, reverse gear, etc.; complete to coupling	145
5½ H.P. Detroit, single cyl., 2 cycle, with carburetor, coil and coupling, AS IS	75
5 H.P. Palmer, single cyl., 5 x 6, two cycle, with carburetor and coil, AS IS	85
5 H.P. Dutton, single cyl., 2 cycle, carburetor, coupling, AS IS	45
5 H.P. Howard, 1 cyl., 2 cycle, carburetor, coil, spark plugs and coupling, AS IS	30
Two 5 H.P. Lozier, single cyl., 2 cycle, jump spark, carburetor, coil, spark plug, complete up to and including coupling, AS IS	75
5 H.P. Eagle, 1 cyl., 2 cycle, with carburetor, coil, and coupling, AS IS	65
4-5 H.P. Knox, single cyl., 2 cycle, with carburetor, coil, and coupling, AS IS	45
3 H.P. Lozier, 1 cyl., 2 cycle, with carburetor and coupling, AS IS	55
3 H.P. Palmer, with M. & B. coil, carburetor and coupling, AS IS	50
1½ H.P. Fairfield, single cyl., 2 cycle, AS IS	35
1½ H.P. Victor, single cyl., 2 cycle, AS IS	35
32 volt Domestic Enginering Co., electric generating unit	250
One gear box formerly used on 250 H.P. Van Blerck engine, suitable for speed boat or hydroplane	100
One reduction gear used with 200 H.P. Sterling, particulars on request	350

Splendid assortment of all sizes, slightly used, reverse gears at attractive prices.

BRUNS, KIMBALL & CO., Incorporated Largest Marine Engine Dealers in the World

MAIN OFFICE AND SHOW ROOMS, 153-155-157-159 WEST 15TH ST., NEW YORK CITY

Shops, JERSEY CITY, N. J.

Telephone 467 Watkins *Branch Store: Bourse Building, Philadelphia, Pa.*

P D Q, owned by Richard T. Davis, Chicago. Powered with GR (4) Sterling. Sold by W. L. Masters & Co., largest dealers of high grade engines in Central West. Hull designed and built by Peter Kargard

When Mr. Davis decided to have P D Q built he naturally came to W. L. Masters & Co. to select his power plant. After looking over our complete line of various sizes and makes he decided upon a Sterling for his particular needs

The Largest Dealers in NEW and REBUILT MARINE ENGINES in the Central West

EXPERIENCED engine buyers know that the stability and reputation of the dealer from whom they buy their engines is just as important as the reputation of the engine itself. This is particularly true in Rebuilt Engines.

Unless we tell you to the contrary, every used engine we sell is taken down, rebuilt and refinished like new in our own shops. Worn parts are replaced and every adjustment is in perfect running condition before we offer it for sale. We guarantee these engines to give absolutely as good service as brand new engines of the same make and power. Look these over:

30-45 H.P. Sterling, 4 cylinder, 4 cycle, 5½ x 6" in excellent condition, reverse gear built in and enclosed, Bosch magneto ignition, force feed lubrication system, a great bargain.

35-50 H.P. 6 Cylinder 4 x 4¾" Engine. Stromberg carburetor, Bosch magneto, coupling, water pump, oil pump, spark plugs, etc.

30 H.P. Doman, 4 cylinder, 4 cycle, 6 x 6", equipped with Bosch magneto and also distributor ignition, reverse gear, force feed oiler, a heavy duty motor good for years and years of service.

22 H.P. 4 Cylinder, 4 cycle Scripps unit power plant with Paragon reverse gear, force feed oiler, water pump, Bosch magneto, a medium duty type motor of excellent construction.

16 H.P. 4 Cylinder, 4 cycle Kermath unit power plant, complete wth reverse gear built in and enclosed, Bosch magneto, etc. in A1 shape.

14 H.P. Gray model T, 2 cyl. motor with two carburetors, water pump, reverse gear, thoroughly rebuilt and refinished, really the best model motor the Gray Company ever produced.

12 H.P. Gray Single Cylinder, thoroughly rebuilt and refinished, complete with reverse gear, a very good heavy duty motor.

8-10 H.P. Two Cylinder, Sterling, 4¾ x 6", complete with mechanical oiling system, reverse gear all enclosed. A medium duty power plant of the very best construction possible; specially priced.

8 H.P. Ferro, 2 cylinder, 2 cycle with reverse gear, fully equipped and overhauled. A smooth running motor and one that has always enjoyed an excellent reputation; a big bargain.

4½ H.P. model R Gray motor. One of the best the Gray Company have yet produced, an ideal motor for a small boat of 20' length and guaranteed.

2 H.P. One Cylinder Regal, used three days only, equipped with Bosch magneto ignition, water pump, reverse gear, couplings, a complete unit and an ideal installation for a small boat, guaranteed and offered at a big reduction. Special price.

If you don't see the size or make of engine you want in the above list, write us. Our lists of rebuilt engines change almost daily. Write or wire us today for prices.

We also carry in stock new motors of the prominent makes shown below. Our service facilities and stock of parts is one of the important reasons why you should select your power plant from our stock.

AUTHORIZED DISTRIBUTORS FOR:

Kermath, Sterling, Scripps,
Universal, Stearns,
Joes Gears, Evinrude, Hyde Propellers

W. L. MASTERS & CO. 231 North State Street, Chicago, Illinois

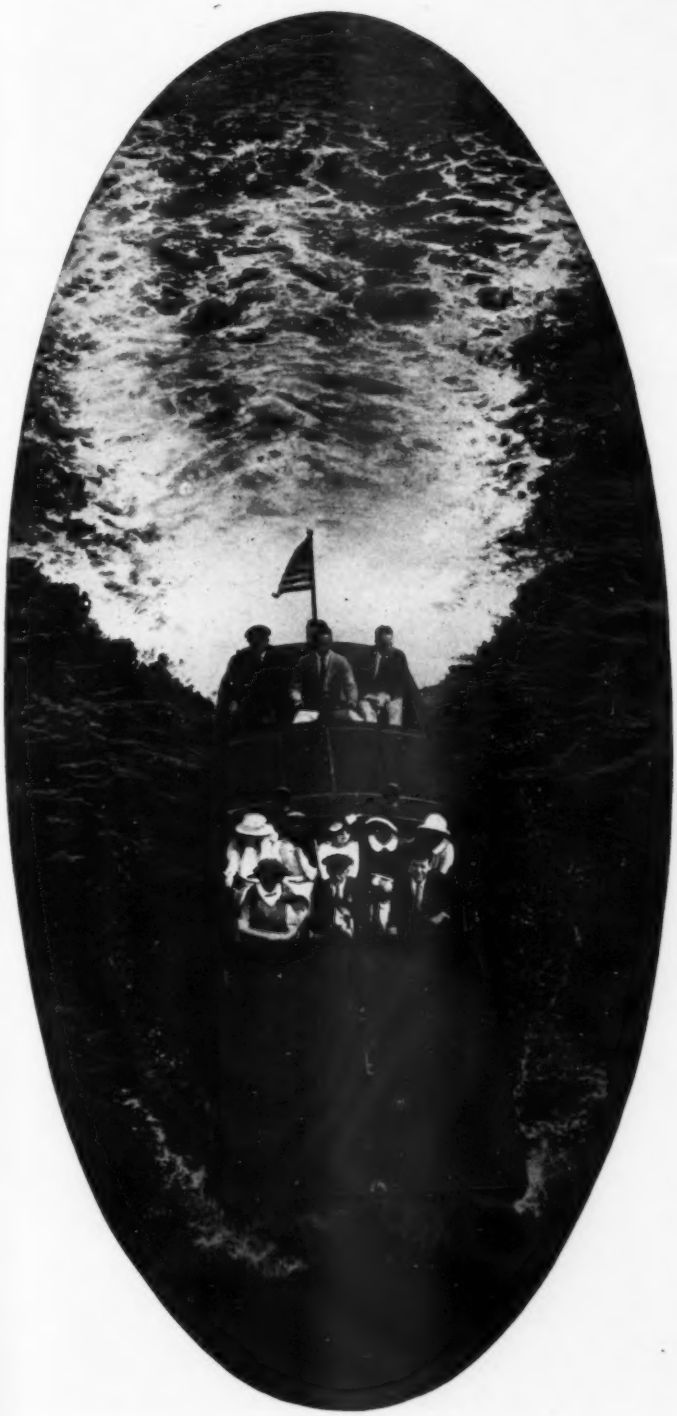
Advertising Index will be found on page 192

Inverted V-bottom and Surface Propeller Boats.

SEA SLED

Hickman Patents in all countries.

Trade Mark Reg. U.S. Pat. Off. Trade Mark Reg. Canada



THE progress of Sea Sleds during 1921 marks the most successful development ever achieved by a boat builder in the period of one year.

With many seasons of experimental work behind them, with many brilliant exploits already to their credit, Sea Sleds entered 1921 with the development stage fully completed, the manufacturing stage for general use still to be accomplished.

During the past season a complete boat building plant has been acquired, and a new company organized for purposes of regular production. In the meantime, the 1921 production of Sea Sleds has established a series of world's records in number and importance never before held by a single boat builder.

Marathon 46-47 miles per hour

Marathon is a 30 ft. runabout owned by Mr. Henry B. Plant, of New London, who uses her as a tender for his sailing yacht, "Spartan," and for fast ferry service to New York and Long Island.

Marathon has made numerous runs between New London and Glen Cove, Long Island—approximately 80 nautical miles — carrying seven or eight passengers per trip without crowding. The run requires about two hours and twenty minutes, running steadily at 31 knots. Power equipment is a pair of 200 H.P. six cylinder Hall-Scott marine motors.

Orlo II carried eleven passengers better than 40 M.P.H. in qualifying for the Fisher Trophy races at Miami. No other fast boat (excepting other Sea Sleds) has such capacity and weight carrying ability

Orlo II, 36' x 7' powered with two GR Six Sterlings. The fastest marine-engined displacement boat ever built until succeeded by Orlo III. Carrying capacity 20 persons

World's Displacement Boat Records for 1921

Fisher Trophy Series, Miami, Florida, February, 1921

1. One mile trials:
   Orlo II, 47 statute miles per hour.
2. Two mile lap record, with 4-buoy turns:
   Orlo II, 40 statute miles.
3. 50 miles, 2 mile course, with 4-buoy turns:
   Orlo II, 38.8 statute miles.

Fisher-Allison Trophy Series, Buffalo, August, 1921

4. One mile trials:
   Orlo III, 57.799 statute miles per hour.
5. Two mile lap record with 1-buoy (hairpin) turns:
   Orlo III, 41.6 statute miles per hour.
6. 50 miles, 2 mile course, with 1-buoy (hairpin) turns:
   Orlo III, 39.8 statute miles.

Wood-Fisher Trophy Series, Detroit, August 30, 1921

7. 2½ mile lap record, with 4-buoy turns:
   Orlo III, 47.11 statute miles per hour.

Gold Cup Series, Detroit, August 29, 1921

(Not in competition with displacement boats.)

8. 5 mile lap, with 4-buoy turns:
   Orlo III, 50.15 statute miles per hour.
9. 30 miles, 5 mile course, with 4-buoy turns:
   Orlo III, 48.2 statute miles per hour.

Orlo II and Orlo III heralded a new type of motor boat possessing great speed with large carrying capacity, shallow draft and practical serviceability. All displacement boat records are held by these Sea Sleds, with the exception of those made when the Sleds were not running through mechanical trouble

Even at 50 M. P. H. the passengers in Orlo III ride in comfort, free from flying spray

Orlo III holds the world's record of 57.799 statute miles per hour for marine-engined displacement boats

Advertising Index will be found on page 192

Marathon at speed. The outstanding advantages of Marathon are the large passenger capacity, the sustained high speed and the dryness, safety and all-around riding comfort in a choppy sea. Boats of the Marathon type are ideal for fast tenders or pleasure runabouts

THAT the many exceptional qualities of Sea Sleds are appreciated by experienced motor boatmen is evidenced by the following interesting letter written by Mr. Harry Greening, owner of Rainbow I and Rainbow II. Mr. Greening's intimate acquaintance with the conventional form of hull in its highest development such as the Rainbows lends weight to his judgment of Sea Sled qualities.

"Hickman has invented a type of boat that is more seaworthy and will carry more load, and at the same time is much faster and more efficient than anything in the world that I know of.

"My Boat 'Rainbow' which I have lately sold, according to competent European and American critics, is the finest boat of her type that has been built and when I owned her held the world's record of 41.8 miles per hour. She has since increased it to 44.02 miles per hour officially. This constitutes a record for any type displacement boat powered with one marine engine. Her weight is about 18 pounds per H.P., including crew of two. She will carry five people in ordinary water, but not where it is rough. Bearing in mind that it is a question of weight per H.P. that up to the present time has absolutely determined miles per hour, along comes Hickman with a craft weighing 26 pounds per H.P. and capable of carrying from 20 to 25 men, in water that the 'Rainbow' could not live in for one minute. He can run through weeds, shallow water and so forth, where the entire underworks of the 'Rainbow' would be swept off.

"I refer to the Sea Sled 'Orlo II' which had a speed of 47 m.p.h., with a quarter more weight per H.P. than my boat.

"He took me out into the Atlantic Ocean well into the Gulf Stream, and ran her full speed with twelve aboard. Our mechanicians on the 'Rainbow' were trying to coax her out of the harbour, but we had to return owing to rough water.

"After we came back from Florida I got Prof. George Crouch to design a boat for me for the 'Fisher Trophy' race in Buffalo that would incorporate Hickman's surface propeller drive. While admitting the superior seaworthiness and weight carrying ability of the Sea Sled, both Crouch and I felt that the great speed resulted from the use of surface propellers. We had to have a boat that would turn quickly for the 'Fisher Trophy' course, and the Sea Sled hull of the type to make quick racing turns had not been developed.

"The new boat was named 'Rainbow II'. Hickman licensed us to use surface propellers and they were placed in a tunnel well forward of the rudders. We wanted great turning ability and got it. While conforming with the 'Fisher Trophy' rules, the boat was practically a step hydroplane. She developed a speed of about 52 m.p.h. miles better than the screw propeller boats of similar weight.

"At the Buffalo Races Hickman appeared with the Sea Sled 'Orlo III'. She had about the same relation of power to weight as either of the 'Rainbows' but she made an official speed of 57.8 m.p.h., five or six miles faster than 'Rainbow II'. With our throttles wide open in 'Rainbow II', 'Orlo' would run away from us at the speed of an ordinary launch. To my mind this settled the efficiency question in favor of the Sea Sled form of hull.

"I have talked with Hickman on this subject and if his explanation of the way the bottom of the Sea Sled hull is kept free from adhesion of the water is correct, as it appears to be, it seems probable that in none of the older forms of boat where water is thrown out at the sides, can we hope to approach the efficiency of the Sea Sled.

"In Buffalo the Sled ran smoothly and without pounding in a heavy chop where the other boats were badly handicapped.

"I always try to keep an open mind on these subjects so that I do not have to fight the inevitable, and after the closest observation extending over some years, I will say that the Sea Sled idea combined with surface propellers is the most efficient thing ever developed. Hickman has, at one stroke, turned things all topsy-turvy in the motor boat world."

(signed) H. B. GREENING.

This passenger carrying Sea Sled at Atlantic City has demonstrated to thousands of visitors the thrill of skimming over the waves at 40 to 45 miles per hour. 40′ x 7′ 9″, powered by two 225 H.P. Sterlings. Capacity 24 passengers

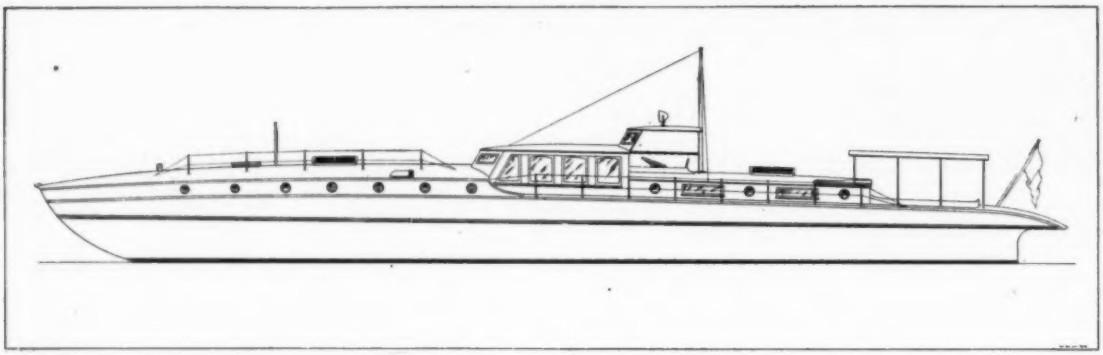
Sea Sled development is also progressing in England, licensed under Hickman patents. This is one of three 42 foot Sea Sleds built for Mr. Claude Graham White. Capacity 30 passengers. Rolls Royce engine

Inverted V-bottom and Surface Propeller Boats.

SEA SLED

Hickman Patents in all countries.

Trade Mark Reg. U. S. Pat. Off.



4 Engine Sea Sled Cruiser

For

Mr. Henry B. Plant

The Sea Sled is not essentially a racing boat, nor even a speed boat within the commonly accepted meaning. It is a new type of hull, equally suited for runabout or racer, cruiser or work boat. It is the first marked improvement in naval architecture in centuries of boat building.

The distinctive features of the Sea Sled are its inverted V-bottom hull, surface propellers and side plate rudders. This form of hull possesses more and greater advantages than have ever before been combined in one boat.

1. **Better Seaworthiness**
2. **Higher Efficiency**
3. **More Comfort**
4. **Shallow Draft**
5. **Large Carrying Capacity**
6. **Great Speed**

Mr. George F. Crouch

Head of the Webb Naval Academy

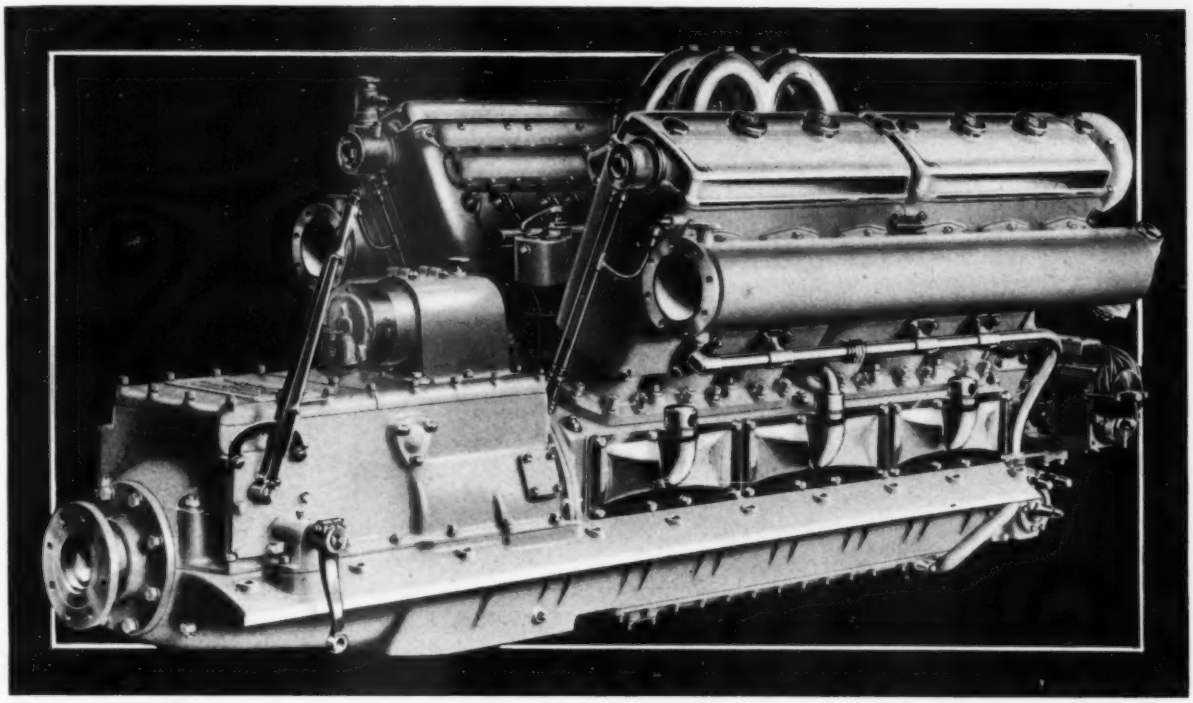
Designer of Rainbow I and Rainbow II. One of the world's foremost designers of motor boats and the leading motor boat authority in America. Mr. Crouch has given up the development of all other types of boats to devote his designing ability to Sea Sleds exclusively.

If demonstrated efficiency is the measure, the Sea Sled is the ultimate type of motor boat. If you are interested in owning an exceptional boat, it will be a pleasure to give you more detailed information without obligation.

THE SEA SLED COMPANY, Ltd.

WEST MYSTIC, CONN., U. S. A.

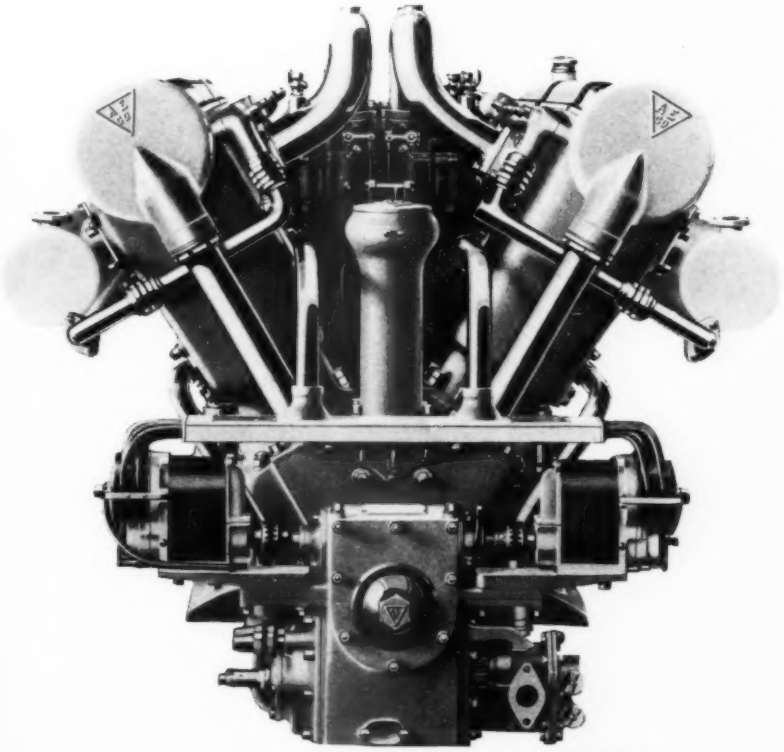
Advertising Index will be found on page 192



ALLISON

The Masterpiece of Marine Motor Engineering

A E CO



THE Allison is built for those yachtsmen who want and can afford the best marine power plant that skill and money can produce.

Its price of $25,000 insures that each Allison is a masterpiece of workmanship, just as the design is a masterpiece of engineering.

It is neither built nor priced to meet competition, in fact it has no competition. There is no other marine motor built to the same standards or the same ideals.

You will realize this in part after reading the following pages. Only a thorough inspection or acquaintance with the Allison in operation can reveal the marked advance over past standards.

ALLISON
ENGINEERING COMPANY
Indianapolis Indiana

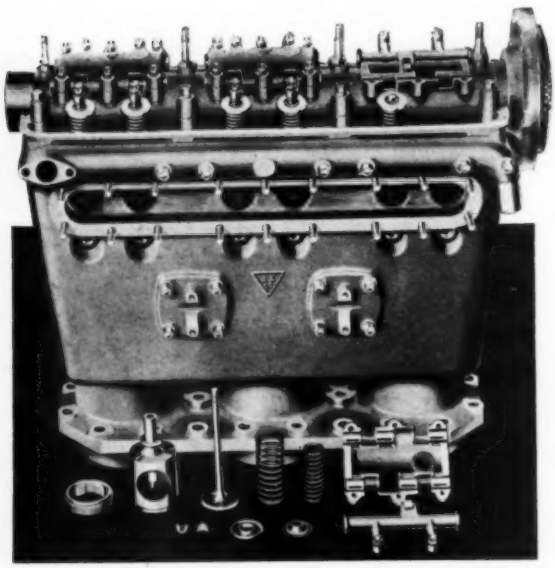
A E CO

ALLISON

THE Allison is the result of three years of conscientious effort to produce the highest type of marine motor possible to build. We realize that the market for such a motor is limited. Quantity production is not intended—but quality production is assured.

The perfection of the Allison is the result of the perfection of each minute detail and part that enters into its construction.

Built for single and twin screw installations.



A cylinder unit of the Allison Twelve, cast three enbloc. Note that overhead camshaft operates directly on the rocker arm rollers. Note the great bearing surface of each rocker arm shaft. Four valves in each cylinder, two springs on each valve, removable cage for each valve. Three spark plugs in each cylinder.

SPECIFICATIONS OF THE ALLISON TWELVE

4-cycle, 60° Vee type, valves in head, overhead camshaft. 12 cylinder, 5½" x 7½", 2138 cu. in. piston displacement. 1000 to 1500 R.P.M. Weight, 4400 lbs.

300	H.P.	at	1000	R.P.M.
325	"	"	1100	"
350	"	"	1200	"
375	"	"	1300	"
400	"	"	1400	"
425	"	"	1500	"

Crankshaft: Hollow, seven-bearing type, 3½" dia. Main bearings 2½" long except center and after main bearings which are 4" long. Crank pins 3 3/16" dia., 3⅜" long. Shaft forged from chrome-nickel steel, heat-treated, machined all over and balanced.

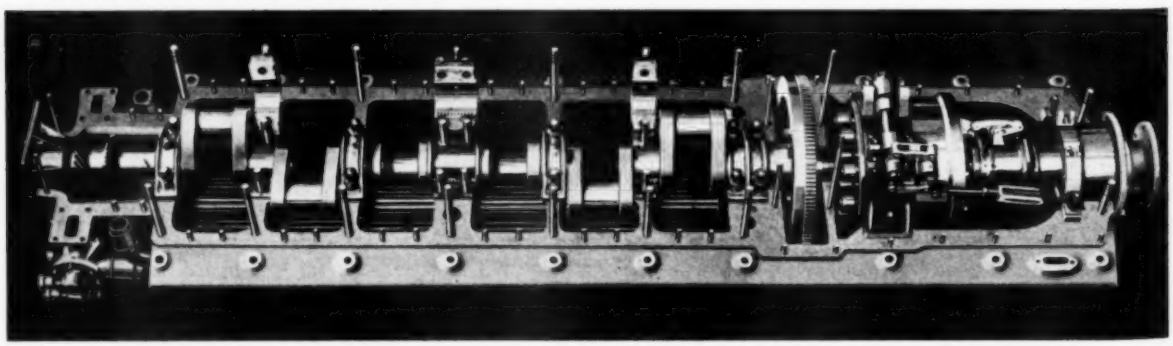
Connecting Rods: Forked pattern. I-beam section, length 15" between centers. Drop-forged chrome-nickel steel, machined all over.

Bearings: Main and connecting rod bearings generous size, Non-Gran bronze lined with high grade babbit by centrifugal process.

Pistons: Carefully designed for lightness and heat conductivity; floating piston pins 1⅝" dia. Four rings above piston pins. Bottom ring beveled to act as wiper; oil groove in pistons drilled to return oil back into crankcase.

Crankcase: Lower half cast manganese bronze carries main bearings. Upper half cast aluminum alloy. Well ribbed and very rigid. Large hand-holes for inspecting, adjusting or removing main and connecting rod bearings.

Cylinders: Cast in blocks of three, close-grain semi-steel. Water distribution around heads carefully worked out to give thorough and uniform cooling. Ample water space provided around valve seats, valve stems and spark plugs. Three spark plugs in each cylinder. Cylinders bolted to upper half of crankcase. Between each cylinder and at ends through-bolts clamp the cylinder flange through upper half of case to lower case, making a very strong and rigid assembly. Cylinder bolts and studs chrome-nickel steel, nuts nickel steel case-hardened.



The Allison base makes the reverse an integral part of the motor. Note the small flywheel, the large all machined crankshaft and liberal bearings with a main bearing between each pair of crank throws.

Advertising Index will be found on page 192

The Highest Priced Marine Engine

WHAT has been accomplished in the Allison? A greater degree of dependability than ever before attained in any marine engine, demonstrated by Allison performances in "Sea Horse," "Aye, Aye Sir," "Altonia II" and others. Smoother operation at any speed than ever achieved in any other internal combustion motor. Likewise greater fuel economy, certainty of performance and freedom from annoyances, major or minor. The Allison is not a high-strung racing creation. Maximum performance sustained.

SPECIFICATIONS OF THE ALLISON TWELVE

Valves: Each cylinder has two intake and two exhaust valves 2" diameter in the clear with 30 degree seats. Exhaust valves seat directly in the cylinder head, intake valves in cages. Intake valves lift 13/32"; exhaust valves lift 3/8". Valves tungsten steel or high chromium steel. Double valve springs on all valves. Each pair of valves operated by a rocker arm, one end of which carries a roller operating directly on camshaft.

Camshafts: Overhead type driven with bevel gears and vertical shafts at forward end of engine. One camshaft for each bank of cylinders. Cams integral, case-hardened, accurately ground. Camshaft hollow, oiled by pressure.

Lubrication: Pressure feed with dry sump. Oil pump gear type. Pressure regulating valve at pump may be adjusted while engine is running. A pair of gears draws oil from oil tank and pumps it into hollow crankshaft, from which it is distributed to hollow camshaft and all bearings. Another pair of gears draws oil from sump and returns it through oil cooler to tank. Oil is strained in tank, passing through two removable strainers of large size. Oil cooler is for continued runs at full throttle. Under normal running sufficient cooling is obtained in lower crankcase, bottom of which is water-cooled for this purpose, and the cooler is by-passed.

Cooling System: Water pump gear type, especially designed for high capacity and efficiency. Water drawn from the sea through oil cooler and delivered to pan on bottom of crankcase from which it goes to cylinders. Water outlet manifold is connected with water-jacketed exhaust manifolds.

Ignition: Two six-cylinder, two-spark magnetos firing two plugs in each cylinder. Third plug fired by battery. Magnetos located at forward end of engine driven by spiral gears and cross shaft from crankshaft. Spark advance is obtained by sliding spiral gear on splined cross shaft.

Carburetor: Accessibly located in center of Vee. Gasoline strained through special duplex strainer, one strainer screen may be removed and cleaned without interfering with operation of the engine. Crankcase breathers piped into carburetor air intake to draw fumes back into engine. Air taken in through large air intake so designed that any drip from carburetors is caught and drained over-board.

Accessory Drives: Magnetos, oil pump, water pump, generator and governor all located at forward end. Magnetos and pumps driven by spiral gears and cross shafts. A vertical shaft and bevel gears drive the governor and generator. Tachometer drive from forward end of crankshaft. Air pump for gasoline pressure feed driven from after end of one camshaft.

Starting System: Leece-Neville two-unit starting and charging system, 32 volts. Generator located in Vee at forward end. Starter mounted over reverse gear housing and operates a Bendix drive on flywheel through gearing. Starting motor turns engine over at sufficient speed to start from magnetos.

Governor: Centrifugal governor mounted at forward end, designed to close carburetor automatically when speed exceeds predetermined point. Up to this point control is full manual and direct to the carburetor.

The forked type connecting rods are drop-forged from chrome nickel steel, machined all over. Special light pistons with four rings. Note how the floating piston pins are held in place.

Clutch and Reverse Gear: Especially designed for this motor and built into the engine. Steel flywheel bolted to rear end of crankshaft forward of clutch and reverse gear. Forward clutch multiple disc using alternate steel and bronze discs of generous dimensions running in oil. Reverse gear planetary type. Clamping band operated by double screw and nut which insures positive engagement and disengagement. Entire reverse gear and clutch assembly lubricated by pressure feed from engine.

Thrust Bearings: Propeller thrust carried by two deep groove ball bearings located at extreme after end of engine. Lubricated from engine oiling system.

Cleanliness: All moving parts covered to insure safety and cleanliness. Ample oil seal and high grade gaskets used on all joints. Oil fumes and vapors drawn from the crankcase to the carburetor.

Economy: Careful design has resulted in an engine of excellent economy. Fuel consumption at full throttle .56 lbs. per h.p. per hour, oil consumption .02 lbs. per h.p. per hour. At normal cruising speed fuel consumption is .53 lbs. per h.p. per hour.

ALLISON ENGINEERING COMPANY

INDIANAPOLIS INDIANA

SPEAKING of standards and ideals, the ALLISON LITE stands in a class alone among electric generating plants.

The four-cylinder motor is designed and built especially for the purpose—not a converted marine, automobile or cyclecar engine.

The generator, switchboard and other components and instruments are also the best of their respective kinds, each having been selected not only for its inherent quality and excellence of construction but also for its particular suitability to the other units of the system.

ALLISON LITE installed in the boat disposes once for all of every question relating to the electric generating plant.

Capacities, 3 K. W. and 4 K. W. 32 and 110 Volts. Weight of unit, 530 lbs. Price complete except batteries, $2,000.

Detailed specifications on request.

ALLISON ENGINEERING COMPANY
INDIANAPOLIS INDIANA

Advertising Index will be found on page 192

STANDARD
REVERSE GEAR

THE Standard Reverse Gear with the *new multi-cone clutch* marks the greatest advance in reverse gear construction announced in the past ten years. At last you can buy a gear that combines easy engagement, positive disengagement and quick adjustability, with tremendous holding power, strength, durability and simplicity.

You'll like the Standard Gear with the new multi-cone clutch. Read about it on the following pages.

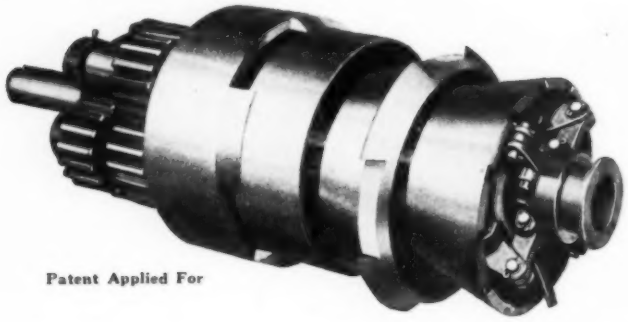
STANDARD GEAR COMPANY

5928 Commonwealth Ave Detroit Mich

STANDARD

"All the Name Implies"

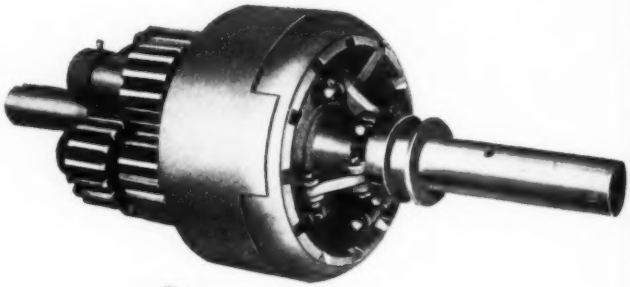
A Better



Patent Applied For

THE multi-cone clutch is an entirely new idea in reverse gear manufacture. Without departing from accepted and proven principles in the type of gearing, we have added a clutch that takes hold as smoothly as a steam engine, holds onto the load like a bulldog and disengages so completely there is no drag in the neutral position. The cones cannot buckle, warp, stretch or drag as discs do when great pressure is applied.

See the great friction surface. This means smooth engagement and unlimited holding power. You can purposely slip this clutch without damage. Long use simply improves its action because the cones lap more perfectly into one another; the longer they are used, the better they get.



The oil groove and packing makes this case oil-tight at every joint. Oil traps at the end of each bearing prevent leakage. The ball thrust bearing at the rear is an integral part of the Standard Gear.

Notice that the friction surfaces in this clutch are at the most effective point—the point of largest diameter. The toggle mechanism is inside the cone. The whole unit is very compact and represents the maximum of friction surface possible in the space it occupies.

When you have seen and tried this clutch you will never buy a reverse gear with any other type of clutch.

Advertising Index will be found on page 192

Reverse Gear

STANDARD

"All the Name Implies"

A Small Gear for Small Engines

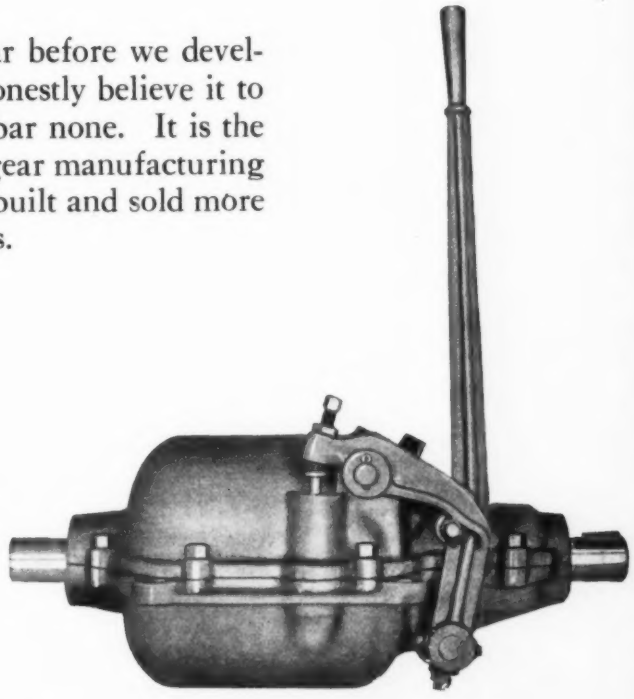
The Standard Midget. The smallest reverse gear made. It's a real Standard—ball bearing, thrust and radial; same as the larger multicone; holds 5 H.P. at 1000 R.P.M.

IN addition to its exclusive multi-cone clutch the Standard Gear possesses every other advantage you want in a reverse gear. It is compact, neat and clean, strong, simple, easy to adjust and always dependable.

The complete enclosure with oil tight case enables us to run this gear in a bath of oil, insuring perfect lubrication and the minimum of wear. The oil tight case keeps your boat and your clothes clean, and it looks better in the boat. It is handsome enough for any boat and any engine.

The Standard was a mighty good gear before we developed the multi-cone clutch. Now we honestly believe it to be the best reverse gear on the market, bar none. It is the result of more than ten years of reverse gear manufacturing experience, during which time we have built and sold more than 30,000 reverse gears for motor boats.

You can tighten the clutch from the outside of the case while the gear is in operation. You can take the gear mechanism apart and reassemble it without trouble because it is so simple. It does not take a mechanic to handle this gear or a machine shop to overhaul it. Perfect lubrication and simple adjustment make further attention unnecessary.



REVERSE STANDARD GEAR

"All the Name Implies"

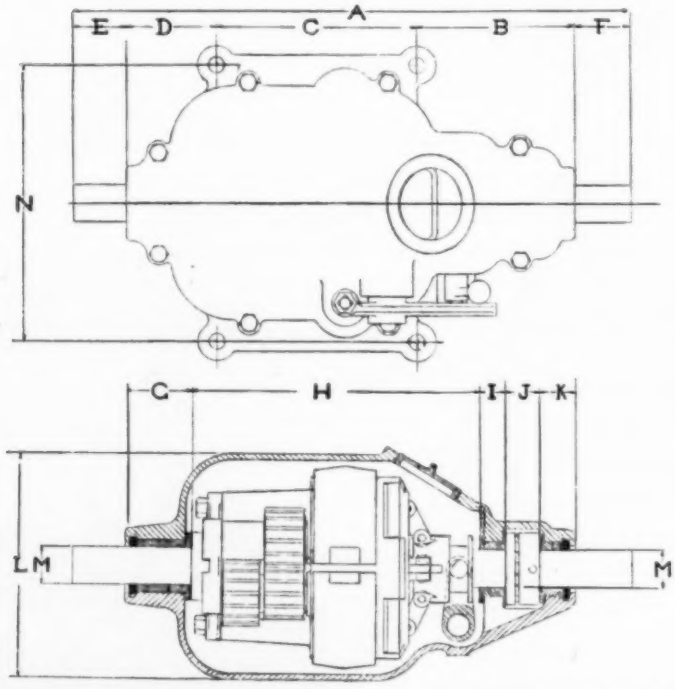
Join the Army of More than 30,000 Standard Gear Users

The Home of the Standard Reverse Gear.

CAREFUL consideration of the Standard and other gears will convince you that the Standard possesses the qualities you want. But you don't have to rely entirely on your own judgment in this because the Standard has been approved and purchased in the past by more than 30,000 other boat owners.

If your present gear is not giving you thorough satisfaction, take it out and put in a Standard. If you are building a new boat or buying a new engine, don't accept any old gear but specify a Standard. Installation details and dimensions are given below.

Engine Manufacturers, Boat Builders: Don't decide on your gears for 1922 until you have tested the Standard with the new multi-cone clutch. Try it out in your own shop. Let us know which size to send you for test.



	M	A	B	C	D
H.P.	5	15	30	60	125
R.P.M.	20	55	75	125	225
PROPELLER	350	450	600	100	175
A	9/16	1 3/16	1 7/16	2 1/16	2 5/16
B	3/16	4/16	5/16	6/16	7/16
C	1/16	5/16	6/16	7	8/16
D	1/16	2/16	3/16	3/16	4/16
E	3/16	1/16	1/16	2/16	2/16
F	3/16	1/16	1/16	1/16	2/16
G	1/16	1/16	2/16	2/16	2/16
H	4/16	8/16	9/16	11/16	13/16
I	1/16	1/16	1/16	1/16	1/16
J	1/16	3/16	1/16	1/16	1/16
K	3/16	1/16	1/16	1/16	1/16
L	4/16	6/16	7/16	9/16	11/16
M	3/16	1/16	1/16	1/16	1/16
N	5/16	8/16	9/16	11/16	13/16

STANDARD GEAR COMPANY

5928 Commonwealth Avenue **Detroit, Michigan**

Cable Address "Stangear"

Advertising Index will be found on page 192

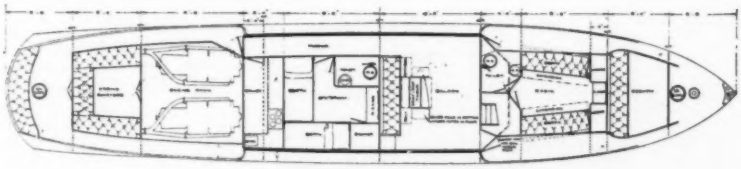
FOR SALE

A Purdy Built Express Cruiser

Length 72 ft. **Beam 14 ft.** **Draft 3 ft.**

Speed guaranteed up to 33 miles per hour. A substantial and seaworthy express cruiser with double planked mahogany hull and walnut finish. This boat is now 80% completed, and can be finished and delivered on short notice.

If you are interested in a boat of this size and character, let us tell you more about it.



SHADOW V

Length 46 ft., Beam 10 ft. 4 in. Long Distance Express Cruiser Champion 1920—First Series. Owner, Mr. Carl G. Fisher, of Indianapolis and Miami

The ideals as well as the ability of the Purdy plant are shown by the class of express cruisers and fast runabouts we have produced. Such boats as Shadow V, Altonia and Altonia II, Sea Horse, Aye Aye Sir, and other famous Purdy boats combine high speed with excellence of design and beauty of finish.

Our facilities and experience are entirely adequate for producing the finest boats that can be built. We have no desire to reach either standardization or quantity production. Each Purdy Boat is simply the best that can be produced in its size and type, regardless of the amount of time and labor involved.

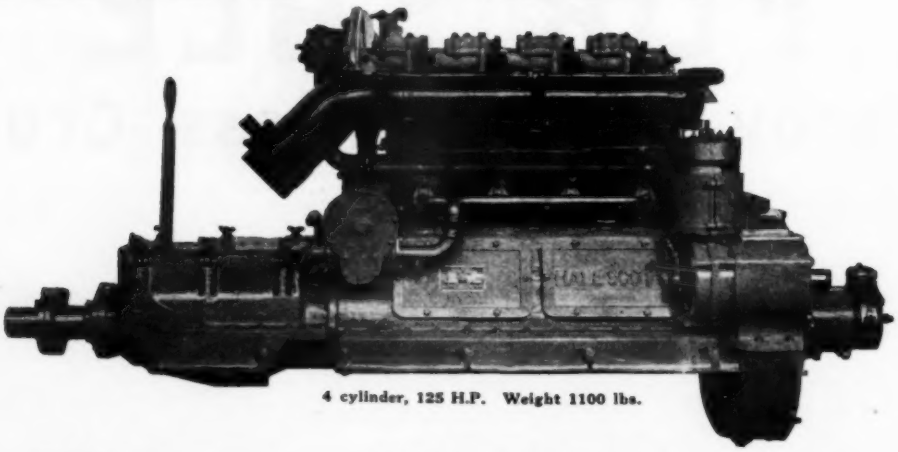
Let us figure on your next boat.

PURDY BOAT COMPANY

Designers and Builders of EXPRESS CRUISERS

Trenton **Michigan, U. S. A.**

HALL-SCOTT

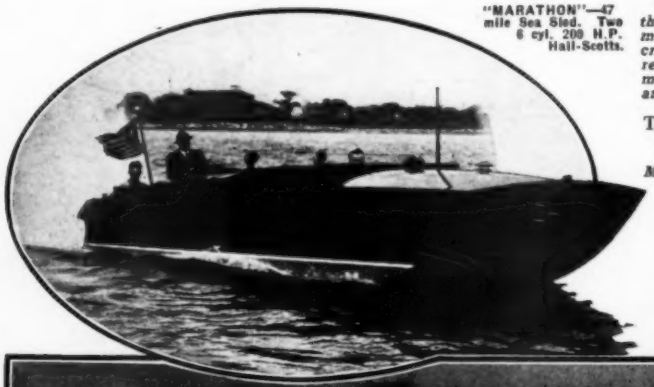


4 cylinder, 125 H.P. Weight 1100 lbs.

THE unvarying success of Hall-Scott Marine Engines in both runabouts and cruisers has proved that the high speed motor boat is entirely practical from the standpoints of service and reliability, if equipped with a power plant properly designed and built for the purpose.

Superior design, more suitable materials and better workmanship has made Hall-Scott engines lighter in weight and more enduring in service than any other high speed engines. Their abilities are matters of fact, amply demonstrated by performance.

Hall-Scott Owners Are More Than Enthusiastic —



"MARATHON"—47 mile Sea Sled. Two 6 cyl. 200 H.P. Hall-Scotts.

Norman De Vaux, Oakland, Calif.—

"I am more than pleased with the pair of six-cylinder 200 H.P. motors installed in my 62 foot cruiser 'Myrno II.' She is really a different craft since making this installation. We are making three to four miles per hour more speed; saved three thousand pounds on engines and reduced the gasoline consumption at least one-third."

Mr. De Vaux has since purchased two additional Hall-Scotts.

The Sea Sled Company, West Mystic, Conn.—

Regarding the 30-ft. Sea Sled "Marathon."

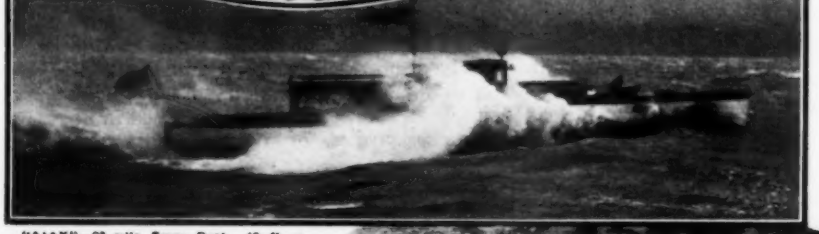
"These engines have run at least three to four thousand miles since Mr. Plant had the boat, and Capt. Perry is very proud of the way they have behaved and stood up in this service."

John L. Hacker, Naval Architect and Boat Builder—

"After riding behind several of your 'fours' there is no need for a customer insisting on a 'six' to eliminate vibration. Your 'four' does the trick. We recommend your motors for runabouts and fast cruisers because holding down the weight means everything in the success of these types of boats; also your engines have proven they will stand up better and longer than any of the other fast turning motors."

A. Crawford Smith, Jr., Baltimore and Edgewood, Md.—

"I told you I wanted a motor that would go when I wanted to and keep it up until I quit. You said that yours would. So far it's more than made good. All told, I have burned over 800 gallons of gasoline this season and with the exception of a few dirty spark plugs, the motor hasn't had a wrench put on it. No carbon has had to be cleaned out, the valves or valve tappets haven't been touched. My boat is now being hauled out for the winter but the last time she ran, the motor turned up 1840 and maintained it like a chronometer until I throttled to make my landing."

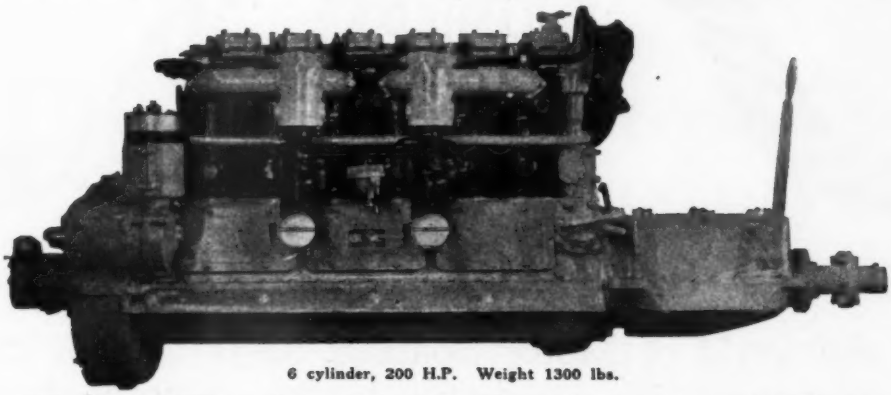


"AJAX"—25-mile Ferry Boat. 40 ft. x 7 ft. 6 in. Six cyl. 200 H.P. Hall-Scott.

"ADIEU"—42 M.P.H. Fisher Allison Trophy winner at Miami, 1921. Six cyl. 200 H.P. Hall-Scott.

Advertising Index will be found on page 192

MARINE ENGINES



6 cylinder, 200 H.P. Weight 1300 lbs.

RUNABOUT speeds from 20 to 48 miles an hour, cruiser speeds from 15 to 35 miles an hour, in serviceable passenger carrying craft, are every day accomplishments for Hall-Scott Marine Engines.

Experienced boatmen know that such service requires the highest degree of power plant perfection. It is not an accident that Hall-Scott engines meet the test. They are a product of the most capable engineering staff and the largest, best equipped plant devoted to the construction of high grade marine engines.

Write for descriptive catalogs. Single and Twin Screw Plants in Stock at

HALL-SCOTT MOTOR CAR CO., Inc.

Eastern Sales and Service Branch

887 NIAGARA STREET BUFFALO, N. Y.

Factory, Berkeley, Calif.

J. W. Packard, Warren, Ohio, and Lakewood, N. Y.—
"Our motor is a beautiful piece of work, combining, in my opinion, the advantages of the best airplane and marine practice. "In spite of its light weight, I don't see why you would not be justified in calling your engine a 'Heavy Duty' one; it stands up perfectly—without ever a sign of distress or a request for babying."

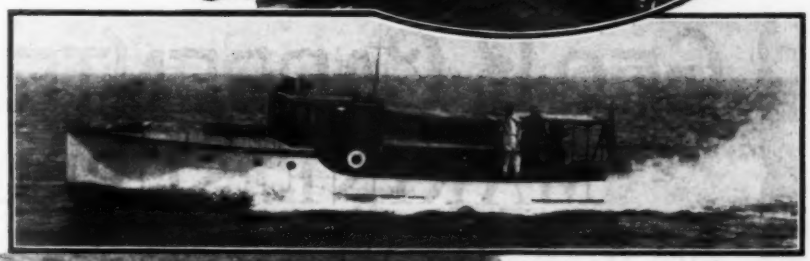
Will Ott, President and Gen'l Manager, Segelke & Kohlhaus Mfg. Co. of LaCrosse, Wis.—
"I do not recall that in running approximately 1500 miles there was a single miss in the firing nor a back fire while the engine was idling, or at slow or high speed."

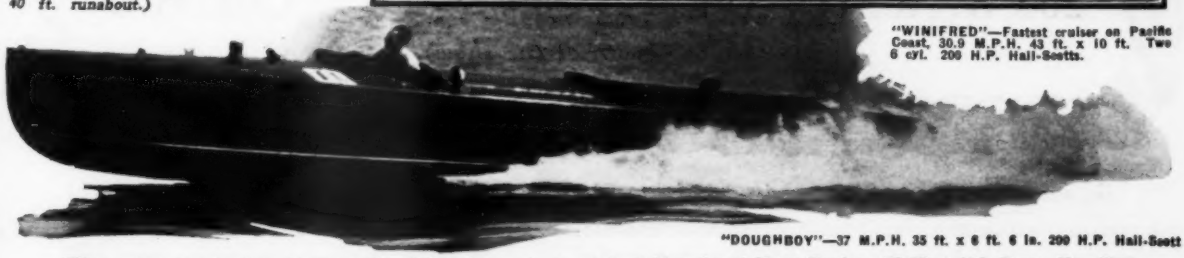
H. N. Slater of New York and Port Washington, Long Island—
"From the start the motor worked beautifully and to date I have driven it more than 600 miles without a miss fire, or any trouble whatsoever. I am extremely well pleased with its operation."

"NICK NACK"—Officially world's fastest displacement runabout powered with a single Marine Engine. 200 H.P. Hall Scott.

Fred E. Holmes, Detroit—
"Your 'six' is the first marine engine that we have had any experience with, that has been able to maintain a speed of 1700 R. P. M. and better all season, without something coming loose."

Isaac Rosenfield, New York and Fort Myers, Fla.—
"We made the trip from Fort Myers to Long Key—Miami, then to Palm Beach without any trouble whatever. I think we averaged, from Long Key to Miami, about twenty-two miles per hour, which was with the large wheel. I think this season I can easily average better than twenty-seven miles per hour."
(4-cyl. Hall-Scott in 40 ft. runabout.)





"WINIFRED"—Fastest cruiser on Pacific Coast, 30.9 M.P.H. 43 ft. x 10 ft. Two 6 cyl. 200 H.P. Hall-Scotts.

"DOUGHBOY"—37 M.P.H. 35 ft. x 6 ft. 6 in. 200 H.P. Hall-Scott

A Wider Vision

of the world of Motor Boating; its principles, its development, its wonderful future, may be had by visiting the present Motor Boat Show.

Those who cannot attend will gain some idea of it from the splendid descriptions which will appear in the marine magazines.

These articles will be a great aid to you in laying out your plans for next season with the aid of that indispensable book, the

CARPENTER MARINE CATALOG

The enthusiasm of last season is going to give to the coming one a marvelous expansion. All of the old boat owners and thousands of new ones will boost the game to the best of their ability.

You of course are one of the interested ones. Send for our Marine Catalog; it's free; start planning now.

GEO·B·CARPENTER & CO.

MARINE SUPPLIES

200 W. AUSTIN AVE. CHICAGO

(See our booth at the show)

Advertising Index will be found on page 192

THERE is one Reverse Gear, which, over a period of years, has built up a steadily increasing reputation for "being there in a pinch", for rendering that day-in and day-out dependable service so absolutely necessary.

¶ This Reverse Gear, functioning faultlessly on thousands of boats of many types, has, more than any other single factor, made these boats safe, efficient and reliable.

¶ YOUR boat must be equipt with a dependable gear to be safe.

(*Continued on page* 147)

TOBIN
Resists the corrosive

TOBIN BRONZE is the trade name of a remarkable bronze alloy which combines high tensile strength and toughness with great resistance to salt-water corrosion. It is the most suitable material ever discovered for underwater parts of motor boats and yachts, such as propeller shafts, struts and steady bearings, propellers, rudders, rudder stocks, hull plates, centerboards, fin keels, fastenings, etc.

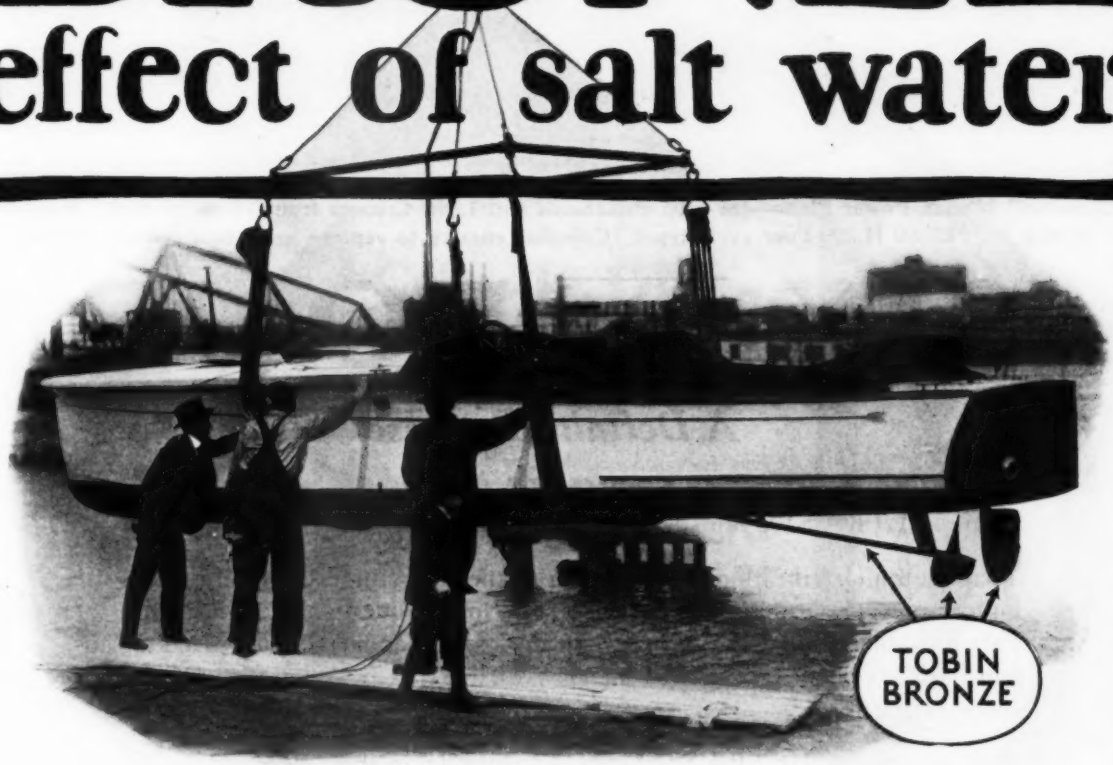
The original formula is still owned exclusively by The American Brass Company, which has been manufacturing this alloy for more than thirty years.

When you specify TOBIN BRONZE, be sure you get TOBIN BRONZE manufactured by The American Brass Company.

Write for descriptive booklet on Tobin Bronze. It summarizes engineering and chemical tests of Tobin Bronze and gives the experiences of well-known boat-builders with the alloy.

Advertising Index will be found on page 192

BRONZE
effect of salt water



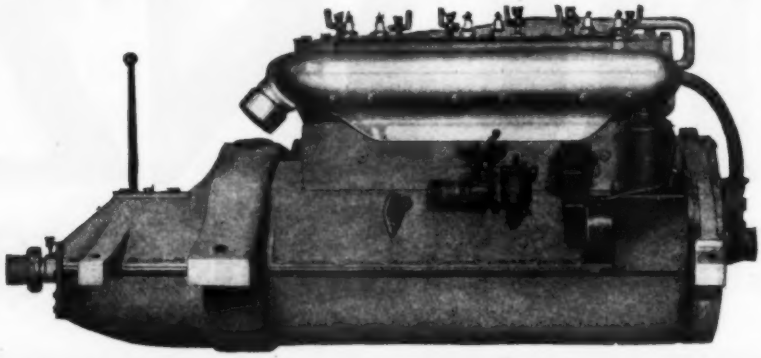
IN boats intended for salt water service, conscientious architects or builders specify Tobin Bronze for the underwater parts. Even though your boat may be used principally in fresh water, it will pay you to utilize genuine Tobin Bronze and thus solve the corrosion problem.

In addition to its strength and toughness, resistance to corrosion and tendency not to foul, Tobin Bronze possesses a high degree of smoothness and uniformity of texture, so that it is easily machined, and takes a beautiful finish. New users for Tobin Bronze are constantly being found.

When you buy an engine or build a boat, be sure the specifications for propeller shaft and underwater parts read, "made of Tobin Bronze manufactured by The American Brass Co."

THE AMERICAN BRASS COMPANY
WATERBURY, CONN., U. S. A.

The Secret of Smooth, Silent, Steady Power



"Ultra-Six" Marine Power Plant—for Fast Runabouts and Light Cruisers from 18 to 35 feet. Bore 3½". Stroke 5". 25-30 H.P. Four cycle type. Compact enough to replace most four-cylinder engines.

SIX *versus* FOUR

A Definite Purpose

TO produce a specially developed power plant filling a specific need brought the ULTRA-SIX into being.

That the quiet, vibrationless operation of the six-cylinder motor provides the logical power for motor boat service is no longer questioned. But owners of Fast Runabouts and Light Cruisers in the 18 to 35 foot sizes have tried to content themselves with the lesser efficiency of the four-cylinder type because of space restrictions.

That is why the ULTRA-SIX was created. It is the last word in Motor engineering for boats of this type, and is *compact* enough to replace most four-cylinder engines.

The price is right because it is built on a quantity production basis, complete in every essential — electric starter, generator, reverse gear, never-failing oiling system, hot-spot manifold, etc.

You will want our catalog. Write today

ULTRA-SIX MARINE MOTOR COMPANY

20 E. Jackson Blvd. Chicago, Ill.

ULTRA-SIX

MARINE POWER PLANT

Advertising Index will be found on page 192

THE ORIGINAL ROBERT BOSCH

MAGNETOS AND Spark Plugs

TRADE MARK
(ON ALL PRODUCTS)

Are Especially Suited For Use On
MARINE ENGINES

FOR YOUR PROTECTION: *LOOK FOR THIS TRADE MARK*

TRADE MARK

ROBERT BOSCH MAGNETO COMPANY INC.

OTTO HEINS, President

123 West 64th Street, New York, N. Y.

Write for Literature

TRADE MARK

Twelve Hundred Miles at Sea in
The Remarkable Run of Gar Jr. II From Florida to New
Records as Well and Beats the Running Time of a Train
Buffalo, and Detroit, a Total Distance of 2,000
COMMODORE CAR
Gar Wood, owner and skipper of the "Gar Jr. II," which he
drove up the coast from Miami, through the Hudson, the
Erie Canal and Lake Erie, back to Detroit
to Detroit

MOTOR BOATING

119 WEST 40TH STREET,
NEW YORK

June 27, 1921.

Prentiss-Wabers Stove Company,
73 Spring Street,
Wisconsin Rapids, Wisconsin.

Gentlemen:

I want to express to you my appreciation for what you have done for the motor boatmen of the country in perfecting your Auto-Kamp-Kook-Stove.

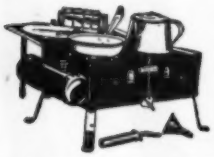
We used one of your outfits on Car Junior II on our run up the Coast from Miami, Florida, to New York, in which we beat the running time of an express train between these two points. Although it was too rough most of the time while we were at sea to keep ones feet on deck, yet we never missed a meal due to your stove. It worked perfectly in all conditions of weather at sea.

I shall be glad to tell others of our experience with the stove whenever the occasion arises.

Yours very truly,

C. F. Chapman
Editor.

C. F. Chapman-B



Two-Burner Kit—Open, showing Equipment.

Two-Burner Kit — Closed. All Equipment Packed Inside.

Equipment, as shown in illustration, consists of folding aluminum frying pan and cover, coffee pot, condiment container, pump, and funnel. All the equipment packs inside the stove, making it as compact as a suitcase. Has a handle for carrying.

Price, complete with equipment $15.50

Price, without equipment..$13.50

ONE BURNER KIT—OPEN

ONE BURNER KIT—CLOSED

This model is very compact and is ideal for use where space is at a premium, or for one person planning a hunting or fishing trip. It takes up no more room than a camera. Has pressure gauge, pump and funnel.

Price, complete.....$8.50

For Smaller Craft

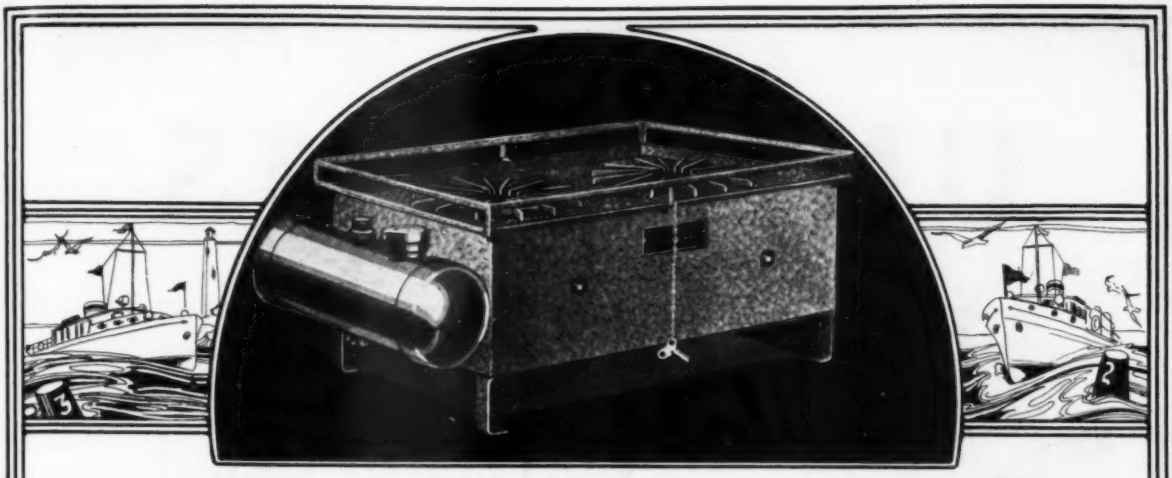
KAMP KOOK KIT

FOR launches, runabouts, and all small craft, Auto-Kamp-Kook-Kit fills the need for a portable stove which is light and compact and can be set up at a moment's notice. Burns motor gasoline, operates the same as Auto-Galley-Kook-Kit. Made in one, two, and three burner models. Auto-Kamp-Kook-Oven enables one to bake and roast meats, etc., perfectly. Folds up flat for carrying.

If your dealer doesn't carry Auto-Kamp-Kook-Kits, write direct for full information.

PRENTISS-WABERS STOVE CO., 108 Spring Street, Wisconsin Rapids, Wisconsin

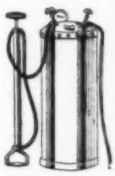
Advertising Index will be found on page 192



The Stove for Your New Boat—

Auto GALLEY-KOOK-KIT

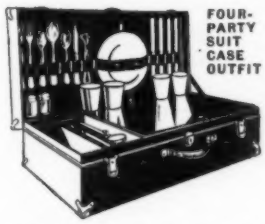
TRADE MARK



If desired, Auto-Galley-Kook-Kit can be furnished with the tank separate from the stove, and equipped with 15 feet of copper tubing so the tank can be mounted on deck.

Price complete with 3 gal. tank, 10" pump..$32.50

Price complete with 1 gal. tank, small pump $27.50



FOUR-PARTY SUIT CASE OUTFIT

This outfit is ideal for the smaller craft which do not have space for a permanently installed stove. The equipment includes all necessary dishes and utensils for a party of four, as well as a Two Burner Auto-Kamp-Kook-Kit, all packed in a handsome suit case.

Price, complete, for four persons..$42.00
Price, " " six " ..$45.00

TWO-PARTY SUIT CASE OUTFIT

This outfit contains a complete assortment of dishes, and utensils for two persons, and a One Burner Auto-Kamp-Kook-Kit, packed in a handsome suit case.

Price, complete.....$25.00

EFFICIENT—practical—built especially for marine use—occupies minimum space—made of the very best materials obtainable—economical to operate—perfectly safe under all conditions.

SPECIFICATIONS:

Size, 20¼" x 10⅛" x 5⅛"; legs 2" high; body made of galvanized iron, strongly riveted; all fittings galvanized or of copper or brass; tank made of brass, carefully tested; has rail around top to prevent utensils from sliding off. Burns ordinary motor gasoline—gives a steady hot blue flame that a thirty mile wind will not blow out. Equipped with a full sheet of galvanized iron for covering of table or bench on which stove is mounted. Has slots for legs to fit into. Pump and funnel with each stove. Price complete.....$20.00

If your dealer or jobber does not have Auto-Galley-Kook-Kit, write direct for complete information.

PRENTISS-WABERS STOVE CO.

General Offices and Factory:

108 Spring Street
Wisconsin Rapids, Wisconsin

You can see Auto-Galley-Kook-Kit on exhibit at The Motor Boat Show, New York City, February 17th to 25th. Booths 83, 85, 87, 89, on the Mezzanine floor.

UNIFORMS

ESTABLISHED 1857

Correct in Detail
Finest in Quality

YOU are invited to visit our exhibit Space 41 at the Motor Boat Show, Grand Central Palace. Here you will find all clothing necessary for the yacht club member, boat owner, captain or crew. If you cannot attend the show, visit us at our headquarters at any time.

From a cap for the club member to the full equipment for the officers and crew of the largest yacht we can fill your every requirement with promptness, satisfaction and economy.

Our new booklet is now ready for distribution and we will be pleased to send you your copy.

B. SCHELLENBERG & SONS

99 to 105 Myrtle Avenue **Brooklyn, N. Y.**

(Near Bridge Street)

Telephone: Main 804

Advertising Index will be found on page 192

Something Else—as Good as

RAJAH SPARK PLUGS

YOU probably know how good Rajah Spark Plugs are,—the favorite marine plugs for more than 20 years. Well, here is something else in the same class, the Rajah Terminal that adds the finishing touch of convenience, appearance and efficiency to your engine. Rajah Terminals are regularly used by most of the leading motor builders in all automotive fields. Now we offer you a brand new type designed especially for the motor owner.

RAJAH SOLDERLESS TERMINALS

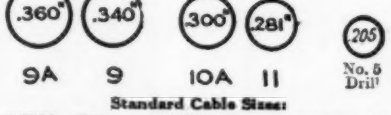
(Actual size)

Thrust Clip | Hook Clip | Ring Primary | Assembly to Cable

The biggest little thing you can do to your boat this spring is to equip all your spark plug wires with Rajah Solderless Terminals. You can do it in a few minutes, without solder or tools. It will cost you less than a dollar, and you'll never stop congratulating yourself on the investment.

To attach terminal to cable you simply strip insulation back 3/16", insert wire in ferrule and screw down the pointed part as shown. It can't shake loose or come apart but you can detach it instantly. Rajah Terminals fit on any spark plug.

If your dealer hasn't stocked this terminal yet, send us his name with 15 cents for a sample. Or order enough to equip all your spark plug wires, stating sizes and types wanted.



Standard Cable Sizes:

5 M.M., 196 | 7 M.M., 275 | 9 MM., 354

Waterproof Rajah Plug
Waterproof
Shockproof
Breakproof

Made especially for exposed Marine Motors
Price $1.25
All Threads

Don't start the season without a full set of Rajah Spark Plugs

This will insure you against loss of time, spark plug trouble and expense for the rest of the year, perhaps for several years. Rajah users tell us of five to seven years' service from one set of plugs. Hundreds of boatmen will use no other. Countless races stand to their credit. They are the most dependable spark plugs it is possible to manufacture.

Take your choice—there is a plug especially suited for every make of motor. If your dealer does not sell genuine Rajah plugs, write us.

Giant Rajah Plug $1.25 All Threads

Standard Rajah Plug $1.00 All Threads

Waterproof Rajah Plug $1.25. Giant Rajah Plug $1.25. Standard Rajah Plug $1.00

These are the celebrated standard Rajah Terminals

Thumb Nut — with all Rajah plugs unless Ball or Stud type preferred
10c each

Regular
Fits any size cable
10c each

Thrust
10c each

Hook
10c each

Primary
7c each

Keeps connections dry
Protects against shocks
Fits any plug or coil
15c each

Furnished with ferrules to fit any size cable

Manufactured by Rajah Auto Supply Co., Bloomfield, N. J., U. S. A.

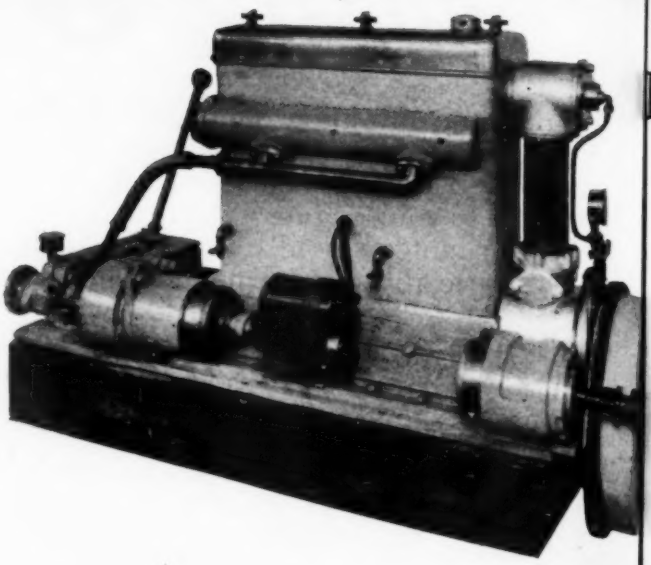
BUY AN ENGINE WITH THE OLD RELIABLE

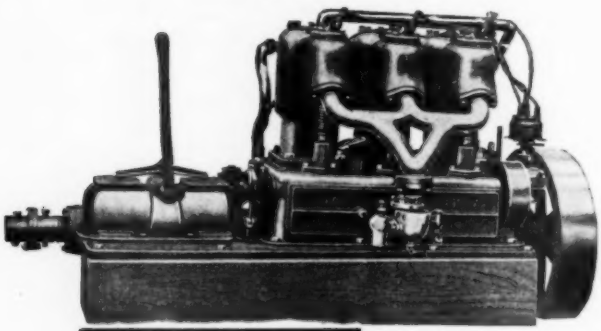
The Old Reliable Palmers with a few of the new ones.

HEAVY duty, medium duty or high speed, we have a motor to give you entire satisfaction for every requirement.

For a generation we have supplied motors to the fisherman, work boat and the pleasure boat owner.

See our exhibit in Space C, Motor Boat Show.





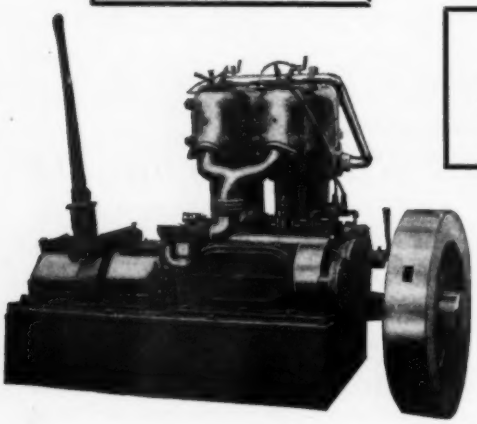
Model N R 3
15-18 H.P.
Bore 5" Stroke 6"
Price as shown, $600

Model V H—14-16 H.P.

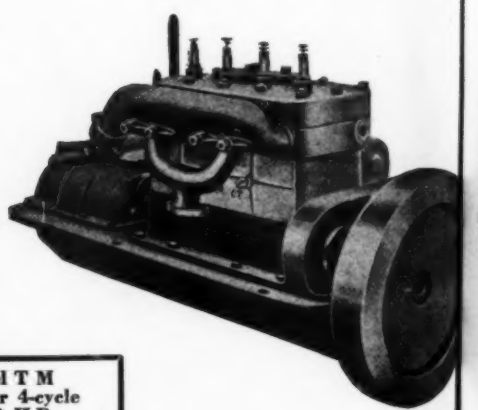
Four-cylinder, four-cycle, high speed overhead cam and valves.

Cylinders cast en Bloc. Equipped with Starter, Generator, Battery, Jump Spark Ignition, High Tension Magneto.

Price, $700



Model F 2
16 H.P.
Heavy Duty
Two-cylinder
four-cycle
Price, $900



Model T M
4-cylinder 4-cycle
8-10 H.P.
Price $300

Advertising Index will be found on page 192

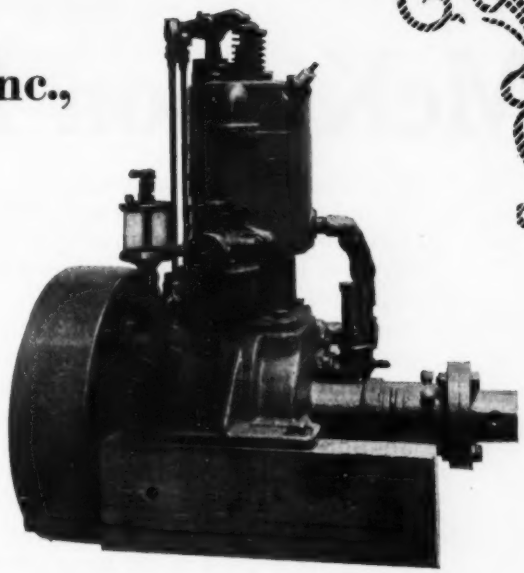
A REPUTATION
PALMER

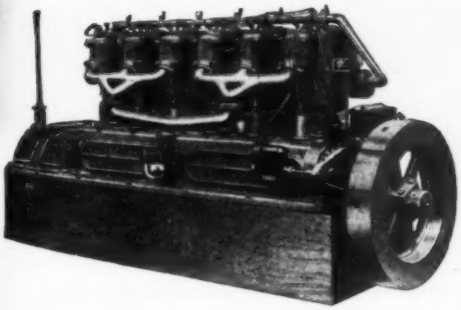
Call or write to our nearest dealer or we will be glad to send you information from our main office.

Palmer Bros., Engines, Inc.,
Cos Cob, Conn., U. S. A.

BRANCHES AND DISTRIBUTORS

New York, 128 Lexington Ave., between 28th and 29th Streets
Baltimore, 514 E. Pratt St.
Philadelphia, 9 N. 6th St.
Portland, Maine, Portland Pier
Jacksonville, Fla., 122 So. Ocean Street
Boston, Mass. Rapp-Huckins Co., 59 Haverhill St.
Norfolk, Va., Gas Engine & Boat Corp.
Vancouver, B. C., V. M. Dafoe



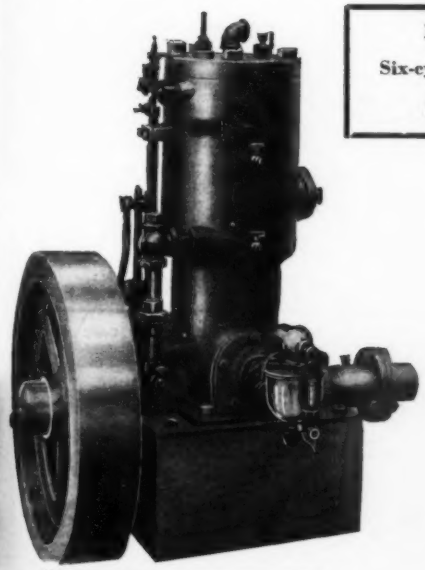


Model Y T

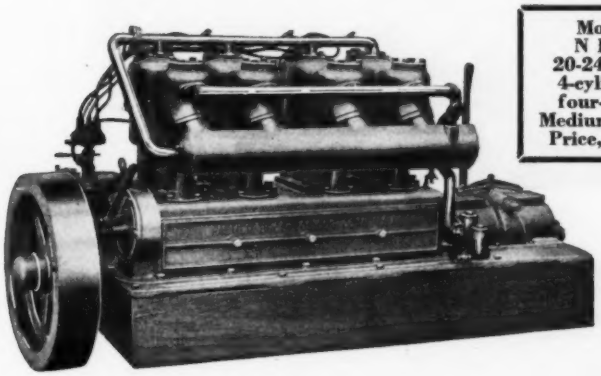
Single cylinder, four-cycle, valve in head. Designed to meet the demand for a high grade yacht tender or small boat engine. Weight 95 lbs. Horsepower, 2.

Price $125

Model N K 6
75-80 H.P.
Six-cylinder four-cycle
Heavy Duty
Price, $3600



Model C
Two-cycle 4 H.P.
Price, $120



Model
N R 4
20-24 H.P.
4-cylinder
four-cycle
Medium Duty
Price, $775

For Powerful Engines, Heavy Boats,
Constant Service, Dependability

Your motor is no better than its reverse gear. Of what use is power if you can't apply it? The reverse gear is a vital part of your boat, a part to select as carefully as your engine. Don't buy any old gear you happen to run across.

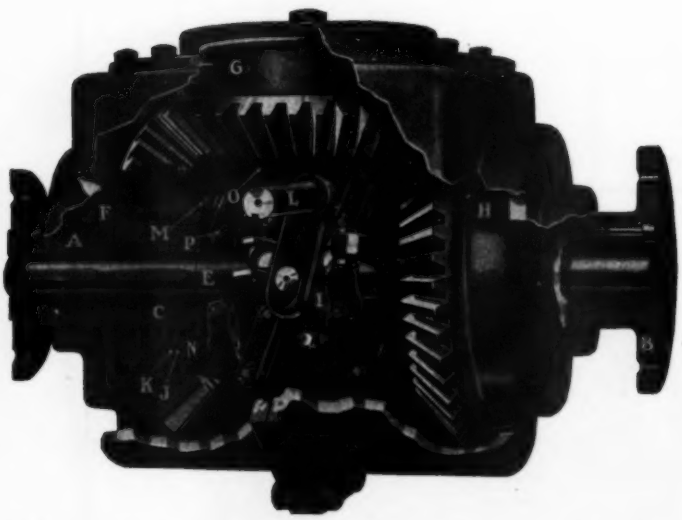
McKinnon Reverse Gear

The McKinnon Reverse Gear was developed solely because we were unable to find a good enough gear in the open market to meet the service requirements of our own commercial boat. Gear after gear was tried,—day after day was lost for repairs and overhauling,—and we needed our boat day and night for delivery purposes.

So we decided to build a gear after our own ideas. Large experience in building automotive transmission parts gave us a comprehensive view of the problem. Thus the McKinnon Reverse Gear was born.

During three years of constant service the first McKinnon Gears required absolutely no repairs or overhauling,—not even an adjustment. Other boatmen asked us to build as good reverse gears for them. The gears sold themselves.

The success and efficiency of the McKinnon Gear is a demonstrated fact. It has made good in the most severe boating service. Furthermore we subjected the McKinnon Gear to a rigid test on the electric dynamometer at the Case School of Applied Science.



Ashtabula Harbor, Ohio, January 13th, 1921.
The McKinnon Iron Works Company,
Ashtabula, Ohio.
Gentlemen:

After watching results of clutch which you had in your boat for a year, I requested you to make up one for mine.

My clutch was installed in a boat which I use for electric welding and is in use during the winter months more than summer. After ice six inches thick has been broken up by harbor tugs, I go any place and have never had any trouble of any kind with my clutch or propeller, due to the fact that the clutch will slip enough to take up the sudden jar on the shaft. While operating my generator I can throw clutch into neutral and run engine for ten hours at a time without injuring clutch and at the same time reduces the load on the engine from the clutch to practically nothing.

Although this clutch has been put to the most severe tests during the past two years, I have never spent one cent on it except for oil—in fact I have never made an adjustment of any kind. I feel perfectly safe in saying that your clutch would outlast and give better satisfaction while in use than all the rest of the clutches put together, and I speak from experience dating from the time gas engines were first used in motor boats.

Yours truly
GEARY BOILER WORKS
Per Frank Geary.

Let us tell you the full details about the McKinnon Gear. Give us the data on your engine, including R. P. M.

Four Sizes Ready for Delivery

No. 1 transmits 4 H.P. per 100 R.P.M.
No. 2 transmits 8 H.P. per 100 R.P.M.
No. 3 transmits 13 H.P. per 100 R.P.M.
No. 4 transmits 20 H.P. per 100 R.P.M.

Other sizes in construction
Absolutely Guaranteed for One Year

McKINNON IRON WORKS COMPANY

Established 1880

ASHTABULA OHIO

Advertising Index will be found on page 192

The STANDARD ENGINE'S Lead

First to Bring Out and Standardize—

Life Saving and Police Patrol Boat No. 1 of Toronto Harbor Commissioners, Toronto, Ont., Can. Powered by a 20-24 H.P. Standard Engine

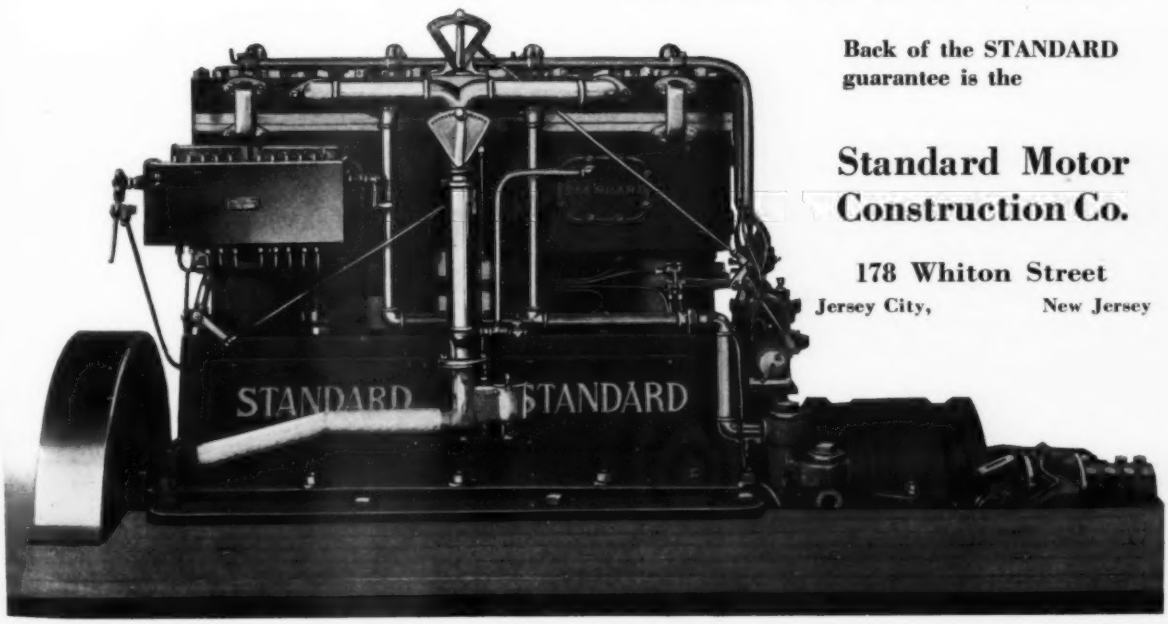
Positive governor control
Positive double ignition
Positive feed lubrication
Positive adjustable reverse gears
Positive plunger pumps
Positive constant level carburetor
Adjustable bronze bearings
Adjustable intermediate gears
Valve in head type
Separate cylinder heads
Direct thrust valve lifters
And many other features that have finally been adopted by automotive engineers.

Every fundamental principle of STANDARD design and construction has been proven right by scientific and service test.

Never has the lead of STANDARD development been so great as today. Never has the STANDARD guarantee meant so much.

STANDARD engines are regularly equipped with either the STANDARD double low tension make and break or the STANDARD double high tension jump spark ignition.

The latest catalogue shows latest features.



Back of the STANDARD guarantee is the

Standard Motor Construction Co.

178 Whiton Street
Jersey City, New Jersey

"Silver Heels II," owned by A. A. Schantz, ex-commodore Detroit Yacht Club. 63′ long, 12′ 3″ beam. Powered by a 70-90 H.P. 6 cylinder 6½″ x 8″ Standard Engine.

Standard Engine Values

DEMAND reflects worth. Present demands for STANDARD engines prove their worth beyond comparison.

Always the cheapest engine in first cost, never before has so much been given to the STANDARD buyer for so little.

At pre-war prices, you get the 1922 model STANDARD engine with its developments and with the regular complete STANDARD outfit and now besides, a very complete STANDARD set of spare parts, regularly furnished.

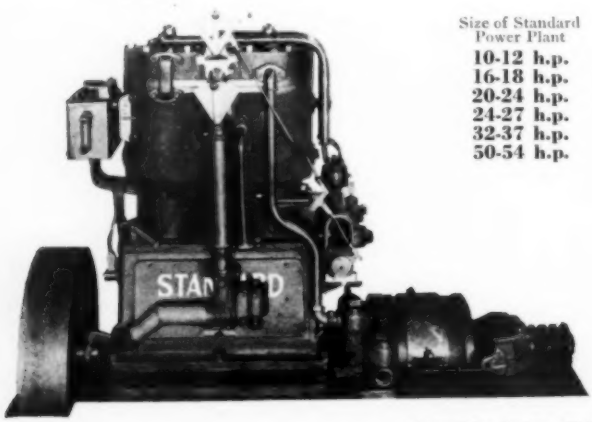
You get an engine such as has been run the equivalent to a year's ordinary work without so much as touching a spark plug.

The self-service of the STANDARD engine, its service without continual outside help, is world renowned.

Buy enduring satisfaction.

The driving power of the STANDARD engine, due to its greater thermal efficiency, greater mechanical efficiency and greater propeller efficiency, is shown by the average size of boats the different size STANDARD engines drive.

The general design, beam, displacement cause some variation in size of engine required for certain conditions, but the table gives a fair average for heavy full bodied boats.



Size of Standard Power Plant		Average Length of Boat	Size of Standard Power Plant		Average Length of Boat
10-12 h.p.	=	25 to 35′	50-60 h.p.	=	60 to 65′
16-18 h.p.	=	30 to 40′	65-75 h.p.	=	65 to 75′
20-24 h.p.	=	35 to 40′	70-90 h.p.	=	70 to 75′
24-27 h.p.	=	40 to 50′	90-100 h.p.	=	75 to 100′
32-37 h.p.	=	50 to 60′	125-150 h.p.	=	100 to 125′
50-54 h.p.	=	55 to 65′			

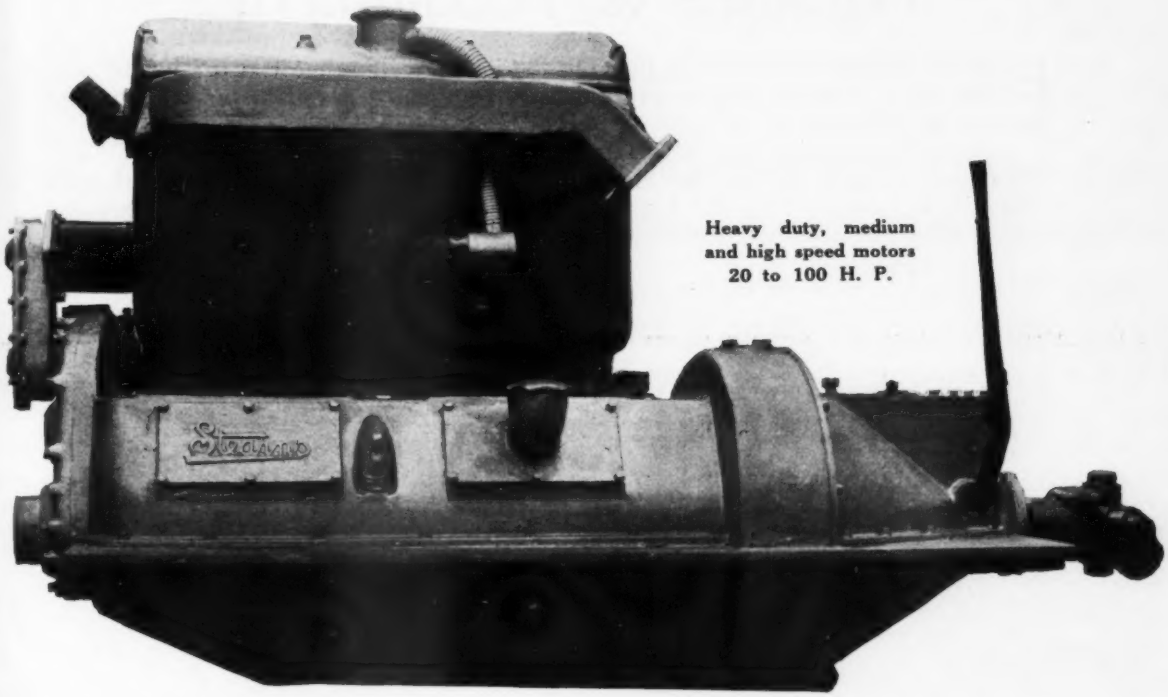
Back of the STANDARD guarantee is the

Standard Motor Construction Co.

178 Whiton Street Jersey City, N. J.

Advertising Index will be found on page 192

Stearns EXTRA RESERVE MARINE MOTORS



Heavy duty, medium and high speed motors 20 to 100 H. P.

BETTER MOTORS—LOWER PRICES

STEARNS Extra Reserve Motors have brought a new standard of value and efficiency to the marine motor market. Their prices are the lowest ever quoted for high grade marine engines.

In fact we want you to know how well they are built before we even tell you how little they cost.

Stearns engineering has given these motors the inherent qualities necessary for reliability and endurance in high duty service. Stearns manufacturing facilities have given the buyer the great advantages in economy and efficiency procured by modern multiple production, without sacrificing quality or workmanship.

STEARNS MOTOR MANUFACTURING COMPANY

LUDINGTON, MICH.

Stearns EXTRA RESERVE MARINE MOTOR

POLICIES vs. POSSIBILITIES

EVERY manufacturer tries to turn out the best possible motor at the lowest possible cost,—just the same as every dealer, boat builder and buyer tries to buy the best at the lowest cost.

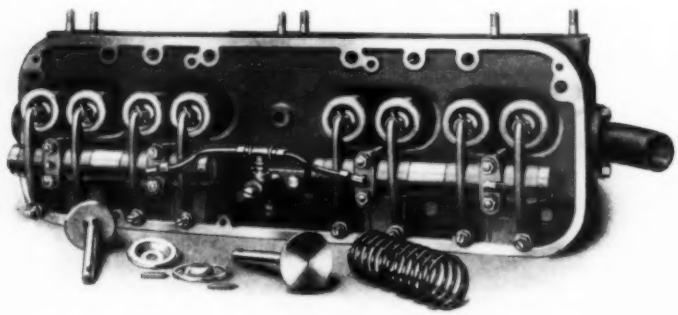
But it is one thing to try, and another thing to succeed.

Our success in making the Stearns such an exceedingly good motor at such exceedingly low prices is the logical result of several important advantages not possessed by any other marine motor builder.

For Example:

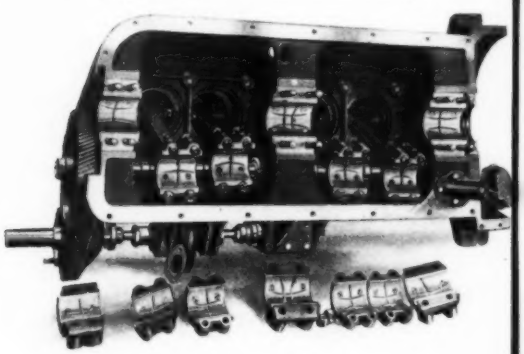
1. **Unlimited financial resources to provide the best manufacturing equipment.**
2. **A definite policy of producing the best, regardless of capital expense.**
3. **A plant equipped with $600,000 worth of the finest machine tools and patterns.**
4. **Practically all parts of Stearns Marine Motors interchangeable with parts of our other industrial motors, permitting real quantity production at lowest unit cost.**
5. **We employ every facility and every instrument known to engineering science to test the accuracy, uniformity and performance of each part of each motor before shipment.**

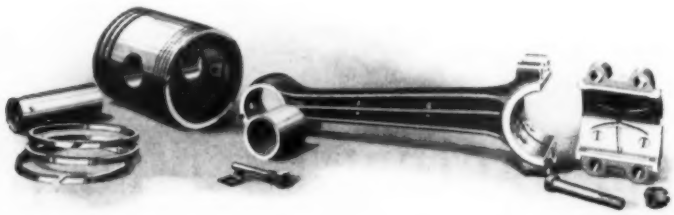
The Stearns crankshaft is chrome nick steel, heat treated, with bearings ground a lapped to size. The shaft is accurately b anced on a Norton crankshaft balancing m chine. Bearings are bronze backed, with hi grade babbit lining. Stearns Motors have t largest crankshaft and connecting rod bearin of any motors of their size and power.



All Stearns motors have overhead valves and detachable cylinder heads. This is the only overhead valve system which permits adequate water jackets for cooling the valves. The entire valve mechanism is removed with the cylinder head, making valve grinding simple, quick and easy. Unusually large rocker arm bearings, lubricated under pressure, insure permanent quietness.

Accessibility is one of the big features of Stearns Motors. Large hand hole plates are provided for minor adjustments and inspection.





The connecting rod is carbon steel, h treated. The cap is held in place with fo ½" chrome vanadium steel heat treat bolts and special extra long nuts. The wr pin end holds a bronze bushing. The pist has three piston rings, the lower one act as an oil ring. The wrist pin is made carbon steel, case hardened and grou accurately to size.

Advertising Index will be found on page 192

A GENUINE MARINE MOTOR FOR HEAVY SERVICE

THE Stearns is a real marine motor, designed for heavy duty, medium or high speed service. It has made good in both pleasure and work boats. It is built for efficiency and endurance. It is a tried and proven design, the success of which has been demonstrated by hundreds of Stearns motors over a period of three years.

When we ship a Stearns Motor it is ready for immediate service. No tight bearings or careful running in. Our double test and inspection methods mean satisfaction from the first.

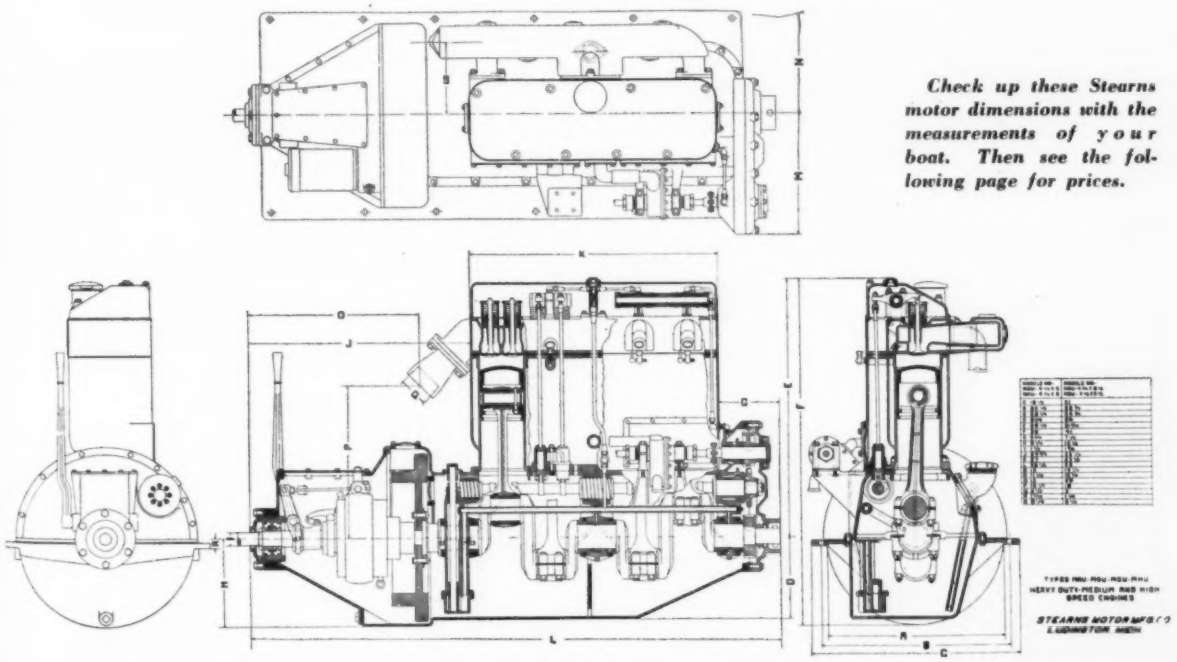
Good Engineering and Careful Workmanship Insure Steady Service and Simple Maintenance for Stearns Owners

Every part of the Stearns motor is manufactured absolutely to a standard within unusually close limits. When first assembled each motor is tuned up to develop its rated power on the Sprague electric dynamometer. Then the motor is torn down, readjusted, reassembled and given a final dynamometer test before shipment.

These tests are the equivalent of several weeks of service and tuning up by an expert marine engineer.

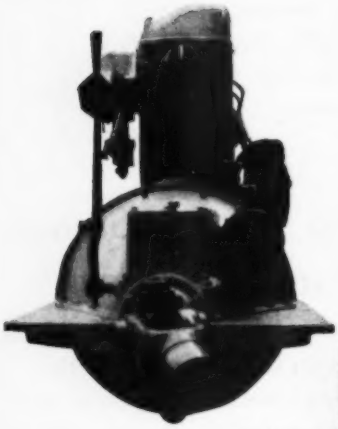
The Stearns lubricating system is one of the most important features of Stearns motors. It is a positive internal pressure feed system, with 5 lbs. to 50 lbs. pressure at various points, reaching every moving part. This insures a plentiful supply of oil at the right place and the right time, as long as the motor is in operation.

Oil under pressure through drilled crankshaft to all bearings, through steel tubes to all wrist pins, to the overhead rocker shaft, etc.



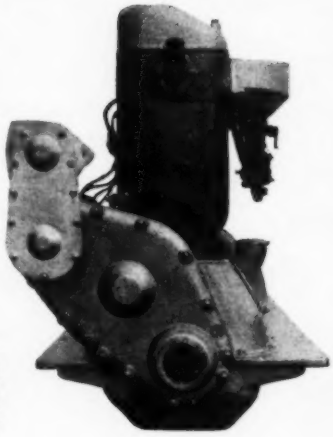
Check up these Stearns motor dimensions with the measurements of your boat. Then see the following page for prices.

Stearns EXTRA RESERVE MARINE MOTORS



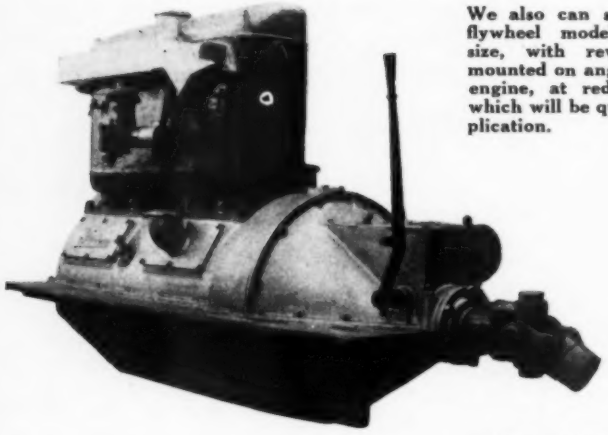
YOU'LL like the Stearns motor, its handsome clean cut appearance, its quality of design and construction, its admirable service qualities and its low cost,—first cost, fuel cost and maintenance cost.

Stearns Motors will stand up to the hardest kind of work at any point in the range of R. P. M. stated below. They are therefore suitable for any type of pleasure or work boats, from the speedy runabout to the heavy cruiser or commercial boat.

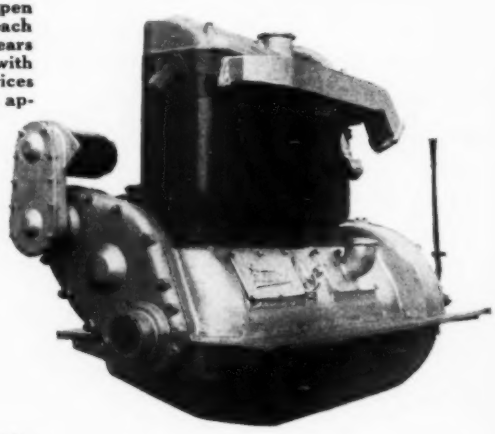


The following Stearns Motors are completely enclosed Unit Power Plant

Model MGU 4⅛ x 6 "	20 HP at 500 to	45 HP at 1200,	$ 950.00
Model MHU 4½ x 6 "	25 HP at 500 to	50 HP at 1200,	1000.00
Model MAU 4¾ x 6½"	28 HP at 500 to	50 HP at 950,	1075.00
Model MDU 5⅛ x 6½"	35 HP at 550 to	60 HP at 950,	1200.00
Model MHR spec. high speed		65 HP at 1600,	1100.00
Model MDR spec. high speed		100 HP at 1600,	1300.00



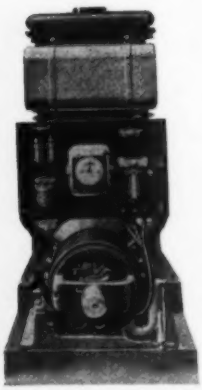
We also can supply open flywheel models in each size, with reverse gears mounted on angle sills with engine, at reduced prices which will be quoted on application.



Write Today for Catalog

STEARNS MOTOR MANUFACTURING COMPANY

LUDINGTON, MICH., U. S. A.



DISTRIBUTORS

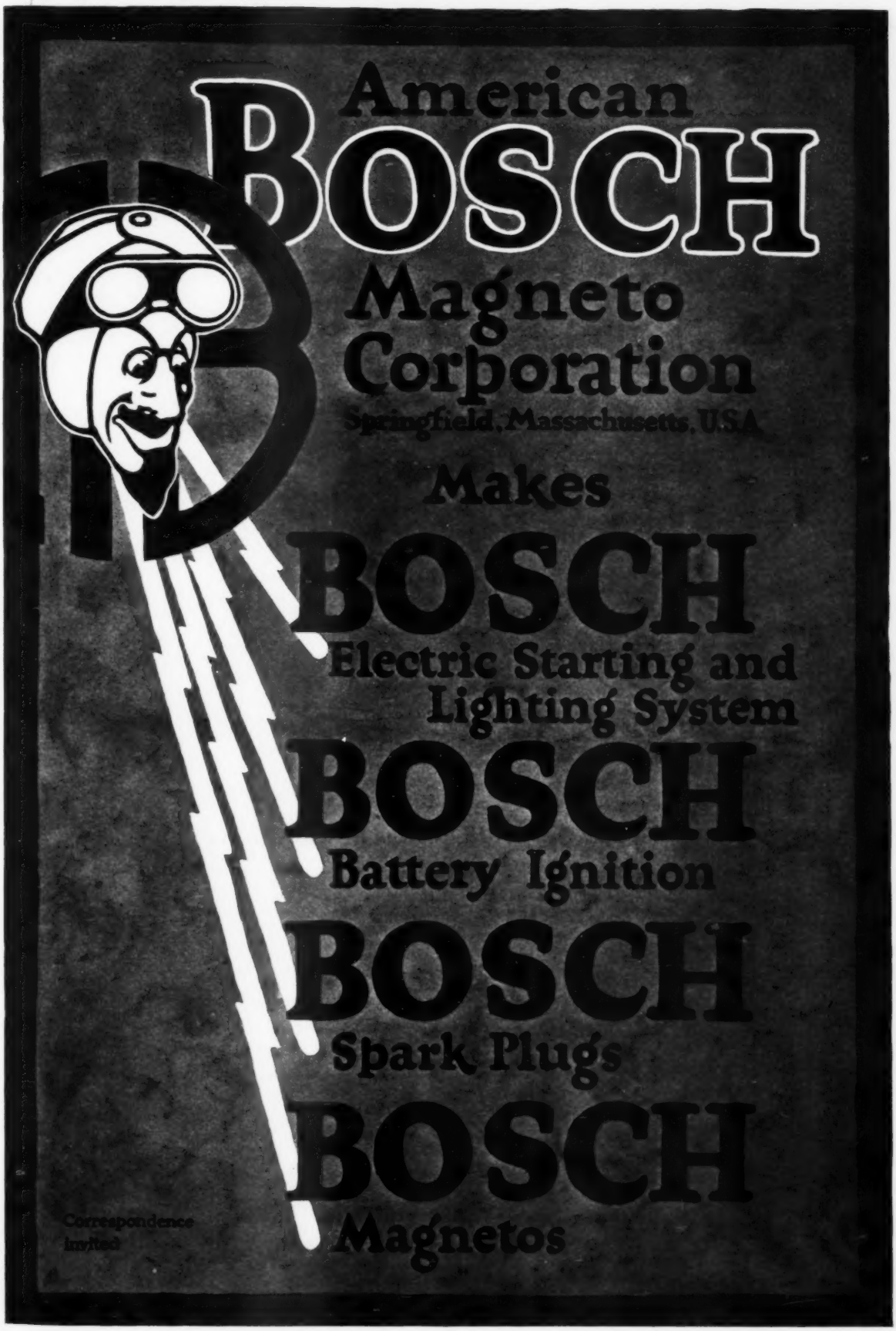
Bowler, Holmes & Hecker Co., Inc., 259 Greenwich St., New York City.
Central Marine Service Corp., 708-709 Vinton Bldg., Detroit, Mich.
W. L. Masters & Co., 229-231 N. State St., Chicago, Ill.
Walter Dean Canoe & Boat Co., Toronto, Ont., Canada

The Stearns Lighting Plant for Boats

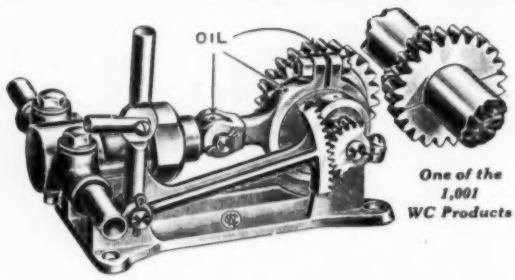
Stearns Lighting Plants, like Stearns Marine Motors, possess the advantages of quality and low cost. Built of the best throughout, designed by experts. Water cooled.

32 volt, ¾ K.W. capacity ***Write for catalog and prices***

Advertising Index will be found on page 192


American
BOSCH
Magneto
Corporation
Springfield, Massachusetts, U.S.A.
Makes
BOSCH
Electric Starting and
Lighting System
BOSCH
Battery Ignition
BOSCH
Spark Plugs
BOSCH
Magnetos
Correspondence
invited

TRADE MARK



One of the 1,001 WC Products

The "Driboat" Bilge Pump

A gear-driven pump that can be thrown in or out of action without slowing the engine. Can be placed on port or starboard side of shaft, as desired, and operated from deck by extending the vertical lever with a piece of pipe or with connecting rods and bell cranks. Made entirely of brass, with the exception of cam and cam shaft, and provision is made for oiling these, which will prevent rusting. Capacity, six quarts a minute at 530 r.p.m.

The pump is of simple construction. Base dimensions, 4" x 8"; space required, 4½" x 9½"; weight, 11 lbs. Spur gear may be bored for ¾" to 1½" shafts.

At your dealer's, or write us. Look for the WC Trade Mark.

Get This Book of Helpful Hints for Motor Boaters

"Sea Craft Suggestions and Supplies" solves those daily "puzzlers" that few know how to handle. Tells how to Box the Compass; what is Proper Ground Tackle; gives hints on Steering gear, etc.; describes WC Dependable Marine Hardware; tells uses. Compiled from 75 years' experience in making marine fittings. 50c prepaid.

WILCOX, CRITTENDEN & CO., Inc. (Est.1847)

4 South Main St., Middletown, Conn.

Visit Space 108 at the New York Motor Boat Show

MAXIM SILENCER

Advertising Index will be found on page 192

TRADE MARK

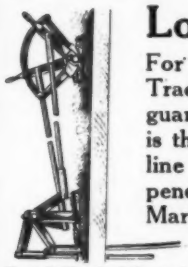
WC Spark and Throttle Controls

One of the 1,001 WC Products

No. 1-F Vertical Control and No. 0-C Control Cranks

Perfect One Man Control From Any Part of Your Boat

THE WC line of Spark and Throttle Controls covers every possible combination necessary for one man control of the engine. Vertical, Bulkhead and Horizontal types; made of special bronze, highly polished, with single or double levers. Controls respond to slightest change of levers; notches in segment prevent accidental shifting. Easy to install. At your dealer's, or write us.



No.1-E Vertical Control
No.0-B Control Cranks

Look for the WC Mark

For three-quarters of a century the WC Trade Mark has been to boat owners a guarantee of good Marine Hardware. It is the mark by which you can identify a line of boat fittings famous for its Dependability. When you insist on WC Marine Hardware, you make certain of getting 100 cents' worth of service for every dollar you pay.

Get This Book of Helpful Hints for Motor Boaters

"Sea Craft Suggestions and Supplies" solves those daily "puzzlers" that few know how to handle. Tells how to Box the Compass; what is Proper Ground Tackle; gives hints on Steering Gear, etc.; describes WC Dependable Marine Hardware; tells uses. Compiled from 75 years' experience in making marine fittings. 50c prepaid.

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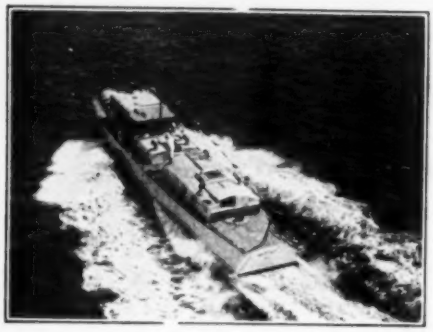


"Whippet," Oliver G. Jennings, owner. Two 400 H.P. Murray & Tregurtha motors with Tvedt Adjustable Mufflers.

Speed and Power with

SILENCE

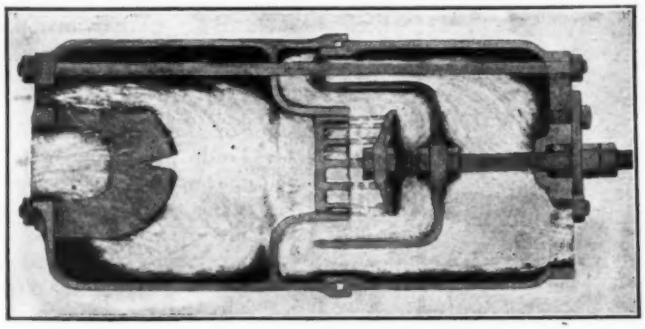
Owners and builders of marine engines, large and small, know that it is a difficult problem to effectually silence the exhaust without creating a harmful back pressure on the engine. Back pressure decreases speed and power, overheats the valves and causes an unnecessary strain on the entire engine.

TVEDT ADJUSTABLE MUFFLER

THE Tvedt Adjustable Muffler is a completely successful silencer which has demonstrated its efficiency in several seasons of marine service. It has been installed on some of the finest and highest powered motor yachts built in recent years.

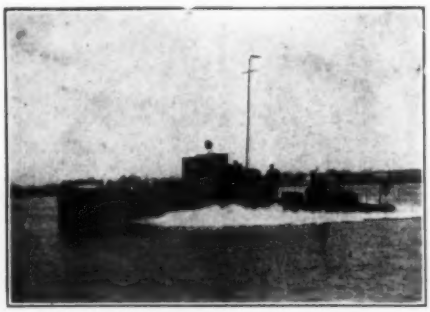
An important and exclusive advantage of The Tvedt Muffler is its adjustable feature which permits the owner or engineer to adjust it exactly to the requirements of the engine after the muffler is installed and while the engine is in actual operation.

Experience has demonstrated that different engines of the same size, power or cylinder dimensions will vary considerably in their muffler requirements. Therefore a stock size muffler can only approximately fit a certain engine. The Tvedt Adjustable Muffler is the only one which meets this condition.



The Tvedt Adjustable Muffler insures the highest degree of silence in the exhaust, and the highest degree of efficiency in the engine. It is designed to expand and cool the hot exhaust gases gradually so that the noise is silenced without causing any back pressure.

Built in sizes from 1½" to 5" exhaust connections.



"Uncas," Prof. Chas. Lane Poor, owner. Two 400 H.P. Duesenberg motors with Tvedt Adjustable Mufflers.

Let our Engineering Department recommend the proper size muffler for your engine. Tell us the bore, stroke, number of cylinders and make of your motor.

Write today for catalog and prices

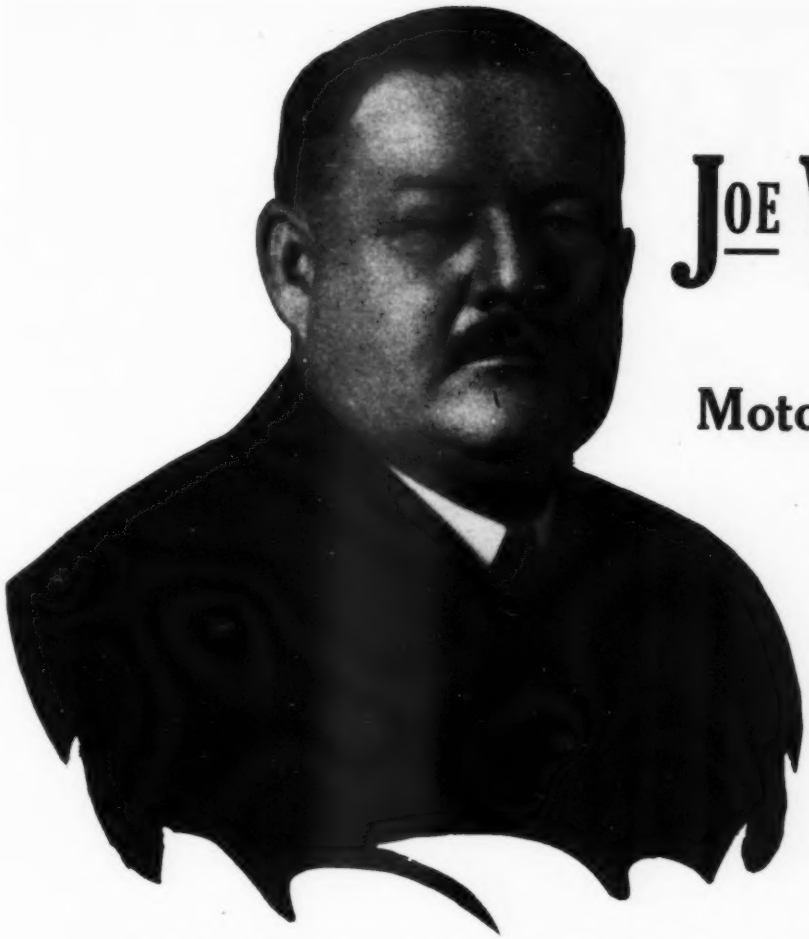
One of six Russian Patrol Boats, each equipped with three 400 H.P. Duesenberg motors with Tvedt Adjustable Mufflers.

TVEDT-SMITH COMPANY

WORCESTER, MASS. **NEW YORK OFFICE, 103 FRANKLIN ST.**

Also manufacturers of the Tvedt Adjustable Tiller Quadrant.

Advertising Index will be found on page 192



Meet

JOE VAN BLERCK

AT THE

Motor Boat Show

February 17th to 25th

GRAND CENTRAL PALACE
NEW YORK

J. V. B. EXHIBIT
at Space F2

MR. JOSEPH VAN BLERCK in person will be in charge of the J. V. B. engine exhibit throughout the Motor Boat Show in New York.

Let this veteran marine engine designer explain to you in his own words some of the new improvements in the 1922 J. V. B., his latest and best engine.

We invite you to come and examine the engine yourself, ask all the questions you wish and put it up to Mr. Van Blerck to give you the benefit of his vast experience for solving your marine power problems.

Two years of general use in all types of boats, both pleasure and commercial, have simply served to prove the remarkable qualities of J. V. B. engines. Construction which seemed almost radical at first has demonstrated its advantages in actual service.

The 1922 J. V. B. is a still better engine. For example we offer a new kerosene burning outfit that is not a makeshift but which will actually start and run the engine on this cheap fuel with the same satisfaction you get from gasoline.

If you are unable to get to the Show, don't fail to write to the factory for latest catalog and specifications. If you have any special questions to ask, Mr. Van Blerck will be glad to answer them by letter. Write today.

THE J. V. B. ENGINE COMPANY

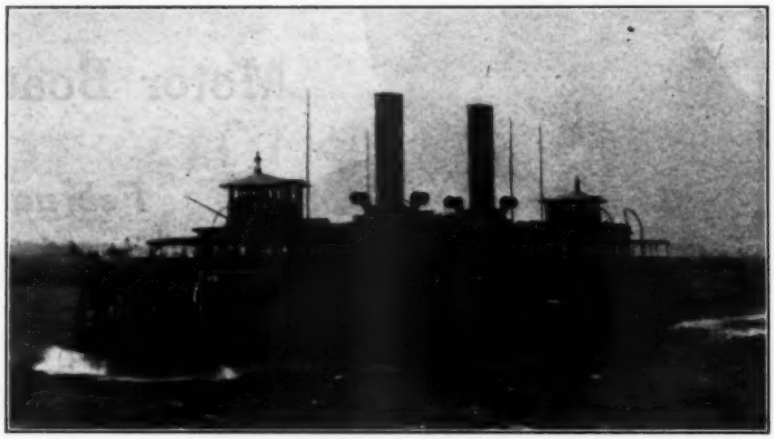
196 Kenmore Blvd. **Akron, O.**

K-A-U-R-I

TRADE MARK

Pronounced "Cow-Rie"

AND THE STATEN ISLAND-NEW YORK FERRY BOATS



Varnished with K-A-U-R-I Waterproof
Spar Varnish

These boats, operated by the City of New York, are subjected to ice and snow, broiling sun, rain, winds and salt water, night and day the year around.

Only K-A-U-R-I Waterproof Varnish could withstand such severe exposure!

Absolutely waterproof — very durable and dries hard over night.

We also manufacture Floor and Porch Enamels, Varnish Stains, and White Enamels.

If you are unable to buy K-A-U-R-I from your dealer, write to us direct.

Send for FREE SAMPLE and circular, "HOW TO REFINISH YOUR BOAT."

BROOKLYN VARNISH MFG. CO.

BROOKLYN, NEW YORK

Advertising Index will be found on page 192

"More Than a Million a Month"

QUALITY
SNAP RINGS
PREDOMINATE

THE Piston RING COMPANY
MUSKEGON, MICH.

The famous Caille five speed motor. Has reversible propeller. Starts with a starter. Magneto built into flywheel. Water cooled exhaust. Finest rowboat motor made.

Caille Neptune Rowboat Motor. A dandy, low-priced motor for general use.

Here's *Your* Motor

Here's the motor for that boat of your dreams—canoe, rowboat, launch, cruiser, workboat—anything that floats and doesn't require over 20 H.P. to send it along at a lively clip. They're not just engines—they're motors tailored to particular types of boats.

If you want to power a rowboat or canoe there are four types of Caille motors to select from. There's the famous Five Speed Motor—the highest development in the outboard motor art. The Caille Neptune Motor ranks a close second and sells at a lower price. The Liberty Drive Motor is the greatest weed eluder you ever saw. Just goes through them like an eel. For an inboard rowboat installation you can't beat the Caille Bantam Motor. Easiest motor to install you ever saw.

For larger boats, we build a complete line of motors from 2½ to 20 H.P. Some are shown on this page. They are built in one to four cylinders—two and four cycle types for standard and heavy duty service. The most complete line you ever saw at right prices.

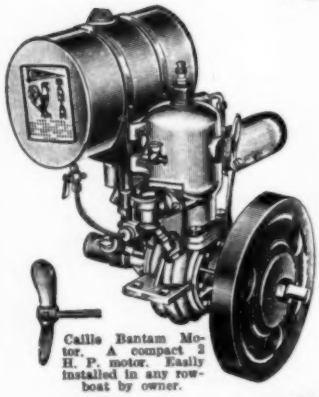
Then there is the Caille Watermobile—a complete water outfit ready to run the minute you launch it. Comprises boat and motor installed. It's like buying a car—you step in, start it up and off you go. No tinkering, no work, no worry. Send for special literature.

We can't go into details here. Our catalogs give all the dope. Tell us about your boat and we'll send you literature on the proper type of motor. Remember, Caille motors are real quality motors—built to S. A. E. standards—carefully inspected step by step in manufacture, tested under their own power when completed and are the result of our 20 years' experience in marine engine design and manufacture. Write us. Let us send you all the facts.

THE CAILLE PERFECTION MOTOR CO.,
42 Caille Bldg., Detroit, Mich.

CAILLE

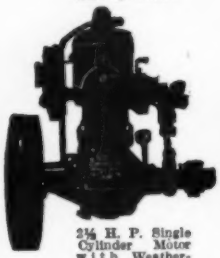
MEANS ENGINES OF QUALITY



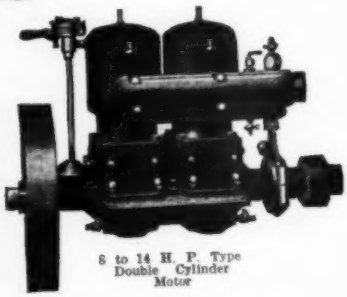
Caille Bantam Motor. A compact 2 H. P. motor. Easily installed in any rowboat by owner.

Caille Liberty Drive Motor. Sensational performer in weedy or shallow water. It attaches to any rowboat. Just the thing for sportsmen.

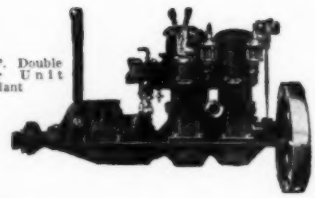
Caille Rowboat Motors
$75.00 and up. A motor for every purse.



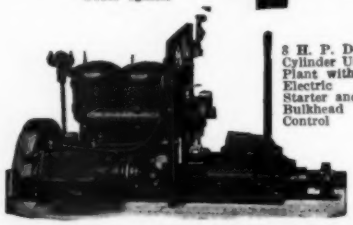
2½ H. P. Single Cylinder Motor with Weather-Proof Igniter



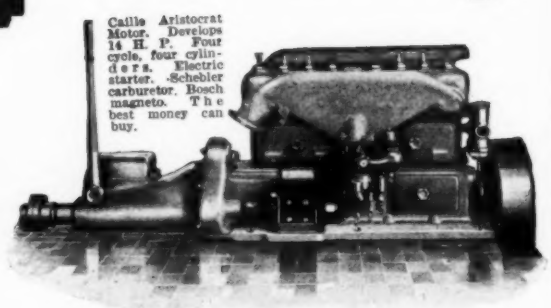
8 to 14 H. P. Type Double Cylinder Motor



8 H. P. Double Cylinder Unit Plant



8 H. P. Double Cylinder Unit Plant with Electric Starter and Bulkhead Control



Caille Aristocrat Motor. Develops 14 H. P. Four cycle, four cylinders. Electric starter. Schebler carburetor. Bosch magneto. The best money can buy.

Advertising Index will be found on page 192

"PLANK WITH CYPRESS AND YOU PLANK BUT ONCE."

A Runabout or a Cruiser.

Plank her with non-rot, non-warp, genuine

"TIDE WATER"

CYPRESS

"THE WOOD ETERNAL"

"OF COURSE"

For all marine use SPECIFY "ALL-HEART" GRADE. It assures the boat owner satisfactory service in the highest degree.

He will be immune from the annoyance and expense of oft-recurring repair bills, which take the joy out of the sport of motor-boating. "Plank with Cypress and you plank but once." Send for

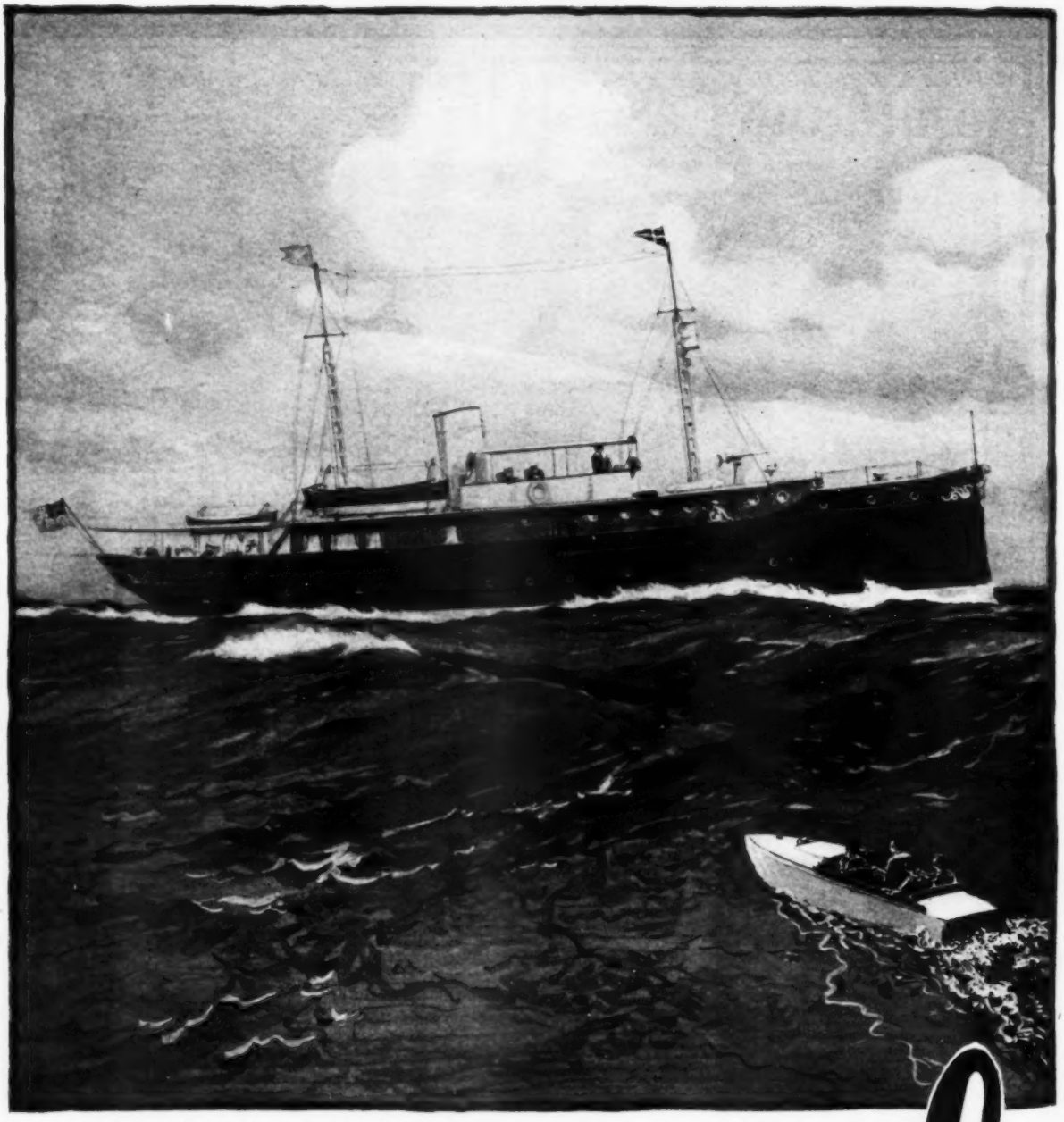
FREE BOOK *Volume 19*, of the famous Cypress Pocket Library, and get *all the facts* about the good properties of Cypress, the best lumber for boats, big or little. Also ask for Volume 1, with complete Government report. Address:

Your local dealer will supply you. If he hasn't enough **Cypress** let us know at once.

SOUTHERN CYPRESS Manufacturers' Association

1317 Poydras Bldg., New Orleans, La., or
1317 Graham Building, Jacksonville, Fla.

Insist on "tide water" Cypress—you can identify it by this mark:

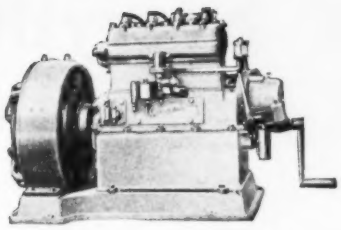


Building for Alfred I. duPont, Esq., designed by Edward R. Carroll. Tenders powered with Universal Marine Motors. Electric current supplied by two Universal Electric Generating Sets.

Universal

MARINE ENGINE

"UNIVERSALS" for Service!



THE picture on the opposite page shows the yacht "Nenemoosha" which is being built for Mr. Alfred I. du Pont, Wilmington, Delaware, from the plans of Mr. Edward R. Carroll, Naval Engineer.

The tenders are equipped with two Universal Marine Motors, and two Universal 4 kw. electric generating sets will furnish the electric current for this yacht.

The selection of this Universal equipment was made by the engineers and builders entirely with the idea of service. Naturally, the owner of such a yacht is in a position to buy the very best that can be had. This is just one more of a great number of extraordinary testimonials to the unusual excellence of design and construction of Universal Marine Motors and Universal Electrical Generating Sets.

For years the Universal Marine Motor has been the standard 4-cylinder 12 h. p. motor —one of the pioneers of its kind and the unquestioned leader today. Not only motor boat owners of the United States, but throughout the entire world, recognize the world wide reputation of the Universal engine.

Conditions have made it possible to announce new and somewhat lower prices, effective January 1st, on Universal Marine engines.

It will pay you to send for the Universal catalog and find out why Universal engines are chosen, not only for all types of motor boats, from the speedy runabout to the family launch, but also for tenders for such yachts as the "Nenemoosha."

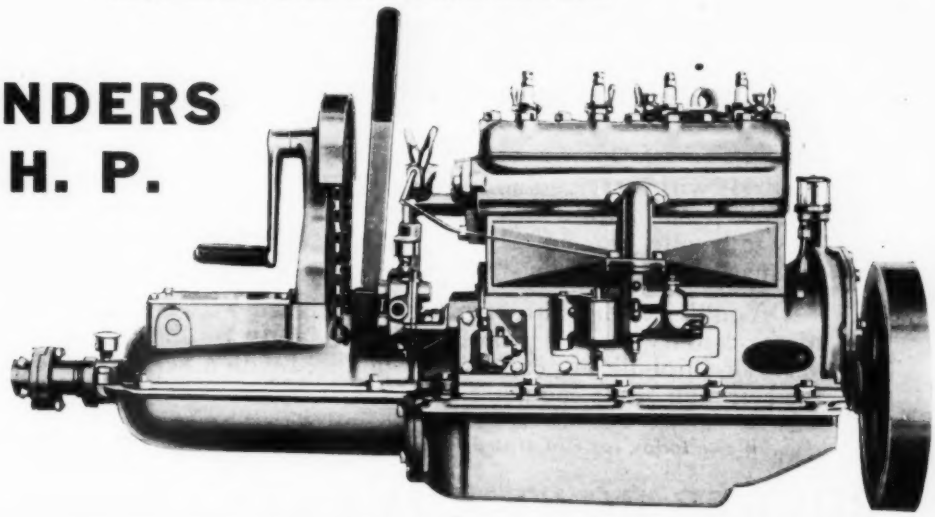
There is only one size and one quality of Universal Marine engine—4-cylinder 9-12 h. p., standard the world over.

UNIVERSAL MOTOR COMPANY

OSHKOSH, WISCONSIN

Not connected with any other company using the name Universal

4-CYLINDERS
9-12 H. P.



Everything You Want In a Cruising Boat

50 ft. of cruising comfort in a 36 ft. boat.

BURGER BOATS BEAUTIFUL

The remarkable thing about the standardized Burger 36 ft bridge deck cruiser is a sense of roominess and luxury that makes one feel he is cruising in a modern yacht of 50 to 60 ft. So skilfully has it been designed that it embodies all the accommodations and all the comforts usually found in a cruiser half again as large.

And to the excellence of design and arrangement we have added a degree of quality in workmanship, materials, equipment and sturdiness of construction that is found only in the work of the best high grade builders.

This is a boat that will merit respect and admiration in your club fleet. It will carry you and your guests wherever you wish to cruise, with complete comfort and dependability. It is a most satisfactory boat to own, easy to handle, economical to maintain, a source of unlimited pleasure to the man who loves the water.

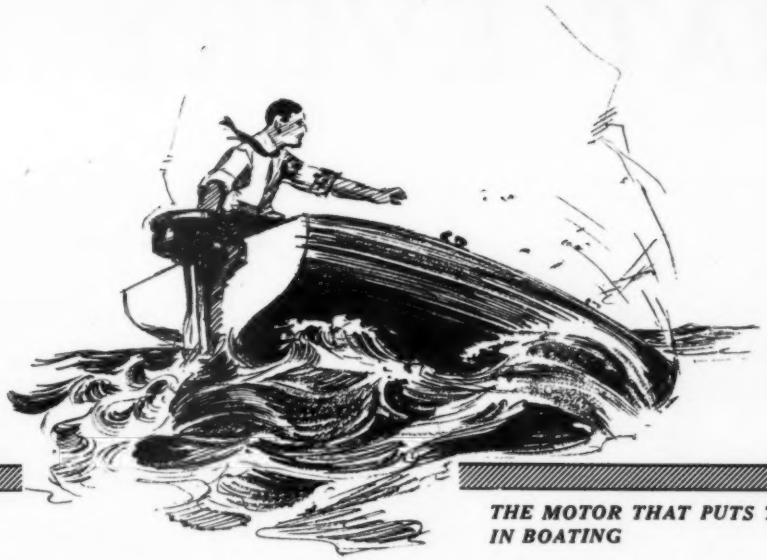
You'll like the Burger Cruiser. Designed by Chas. D. Mower, one of the country's leading naval architects; built by Burger, with over 60 years of shipbuilding experience; powered with a Scripps motor, one of the best high grade engines.

Write today for illustrated catalog. Immediate and spring deliveries.

BURGER BOAT COMPANY, Manitowoc, Wisc.

Advertising Index will be found on page 192

$90
WITH BATTERY IGNITION



$95
WITH MAGNETO IGNITION

THE MOTOR THAT PUTS THE TING IN BOATING

The thrill of power boating at a fraction of the expense

The lure of the water highways sparkles the same invitation to the *Spinaway* propelled craft as to the expensive motor boat. Waves are just as dancing, skies just as blue, fun just as keen —and it's all yours at an operating cost that scarcely disturbs the loose change in your pocket.

A rowboat is just a rowboat until you clamp a *Spinaway* Motor on the stern. Then it's a power boat—but what a difference in the expense! A fraction of the cost as regards initial investment. A fraction as regards care. No Government tax to pay. Nothing to put out except a trifling amount for gas and oil. No wonder many people who *have* motor boats are running around with *Spinaways* in preference to getting the big boats into the water, putting out money for their upkeep and paying the tax.

Spinaway Detachable Rowboat Motor

Spinaway engineering skill gives you the most perfected detachable marine engine. The *Spinaway* is just as fool proof as it is powerful. No mechanical knowledge or experience necessary to operate it. Patented Disappearing Crank Handle protects you and your crew. Spark plug is protected. There's not a spot in the design where you can get your fingers in. Motor tilts automatically when hitting an obstruction. Tiller is self-locking. Silent running assured by underwater exhaust.

You can't think of a single point to promote safety, *ease of operation, power* and *beauty* of *design* that *Spinaway* engineers haven't already worked out for you. The *Spinaway* is the "Beauty Motor" — dependable and economical to the last degree.

Dealers

Spinaway representation is open for certain sections. We will be pleased to advise reliable dealers regarding our Dealer Plan.

THE COUPON BRINGS THE FULL STORY

And what an interesting story it is in the unusual form we offer it! A catalog that hasn't a dry spot in it. A Specification Sheet, different from anything you have ever seen, that dissects the Motor thoroughly and bares every mechanical point to your closest inspection.
Send for this material now—NOW when you mean to do it.

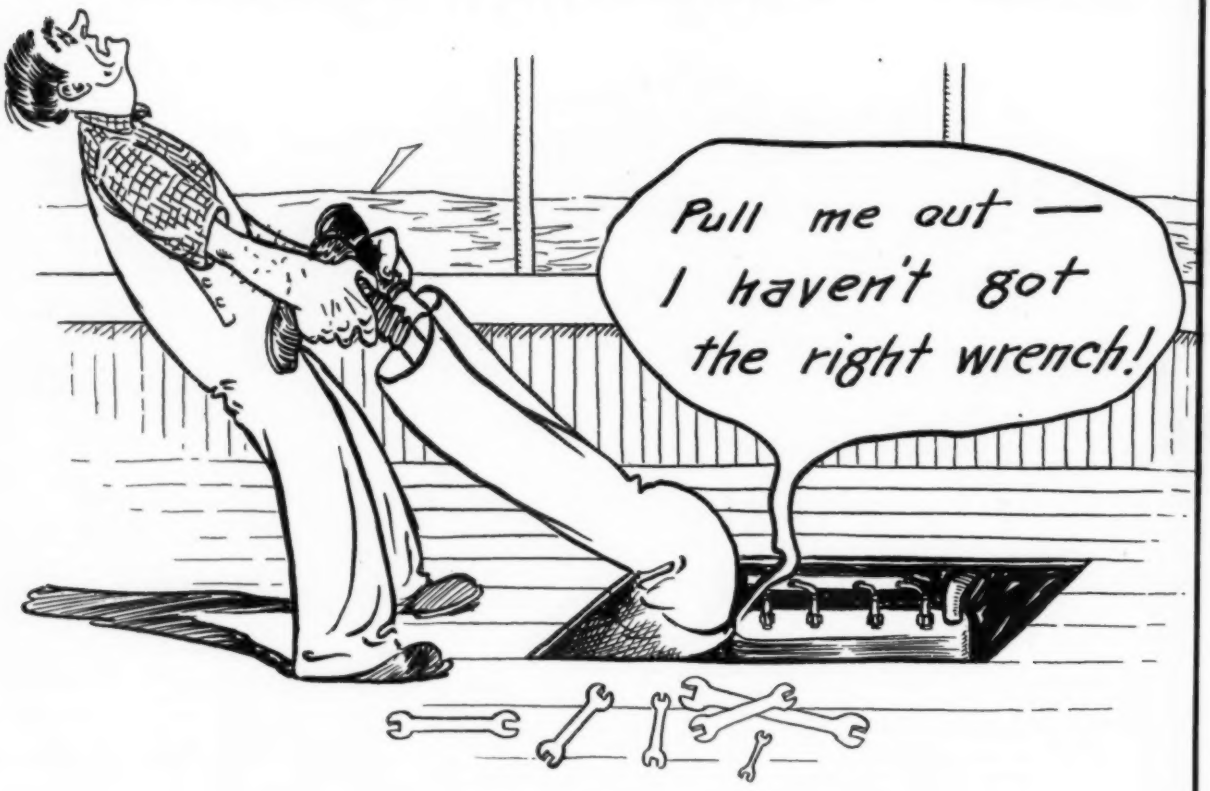
SPINAWAY BOAT MOTOR CO.
Owned and controlled by HOEFER M'F'G. CO.
235 So. Chicago Avenue, Freeport, Ill.

SPINAWAY BOAT MOTOR CO.
235 So. Chicago Ave., Freeport, Ill.
GENTLEMEN
You may send me the full story and specification sheet of the Spinaway Detachable Rowboat Motor.

Name.....

Address.....

WHAT EVERY BOA



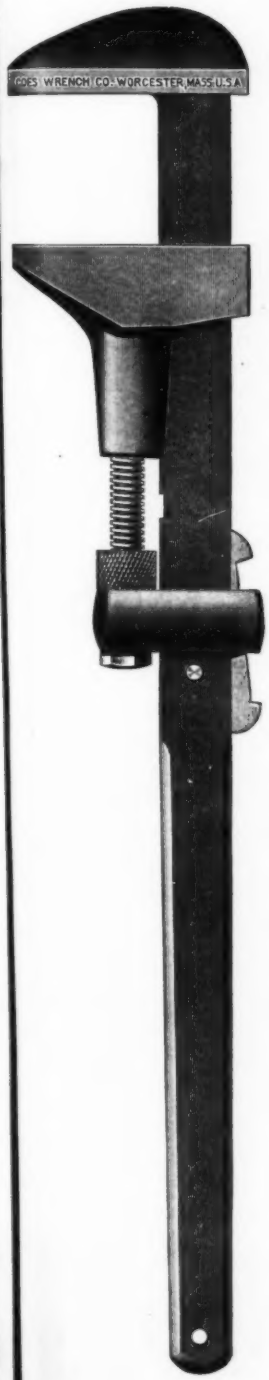
TRADE MARK
REG. U.S. PAT. OFF.
NO. 64696

Coes

WRENCHES

Advertising Index will be found on page 192

OWNER KNOWS



Everybody has two hands. But if you are forced to carry a handful of "open-enders" down a ladder to operate on one nut,-- *How about it, how many hands have you ?*

One "COES" will fit a basket-full of nuts, hex, square, old, new, whether they are rusted on or not. You have one hand free to wipe your nose or hold a torch.

And when you pull --- the nut starts or you tip the boat over. Fact, brother, 'sa fact.

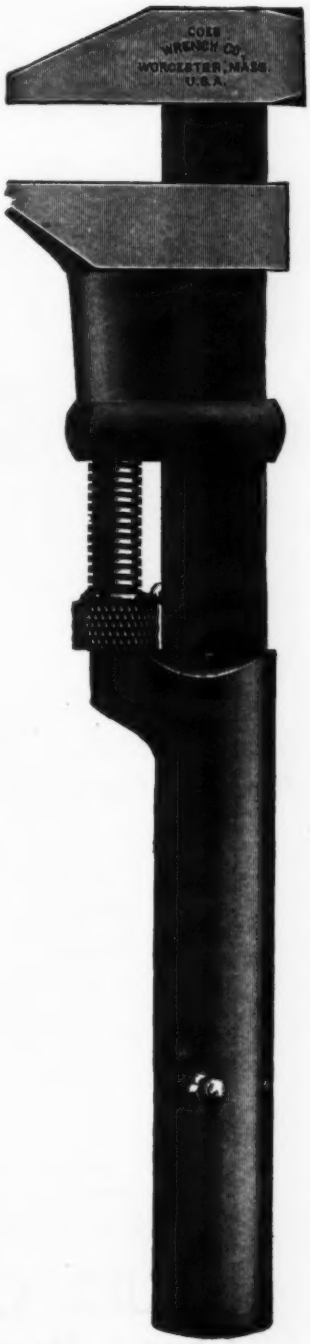
And the range of sizes, 4" to 72", in 12 sizes, will cover anything from spark-plugs to propeller nuts.

Sold by all reliable jobbers and dealers.

Ask yours.

COES WRENCH COMPANY

WORCESTER, MASS.



See This Motor at the Show

18-25 H. P. KRAUS OIL ENGINE
Weight 513 lbs.

You will miss one of the most interesting features of the Motor Boat Show if you miss the exhibit of the Kraus (Continuous Combustion) Fuel Oil Engine.

The Kraus is a light weight, high speed, oil engine that may be run on any liquid fuel,—crude oil, vegetable oil, alcohol, kerosene, or distillate.

It is an internal combustion engine but it operates on entirely different principles from any other oil, kerosene or gasoline motor. It has no carburetor, magneto or complicated ignition system. Only one spark plug, regardless of the number of cylinders, and that plug is used for starting only. The motor never requires cleaning—no carbon troubles to overcome. It has the combined advantage of the steam as well as gas engine. Its operating cost is only about 1/6 as compared to gasoline engines.

We are prepared to issue licenses on a royalty basis for manufacturing the Kraus Oil Engine.

Engine builders will find it more profitable to manufacture this engine than to compete with it. A demonstration will show you why.

Full data on request by mail

FUEL OIL MOTORS CORPORATION

50 Church Street **New York, N. Y.**

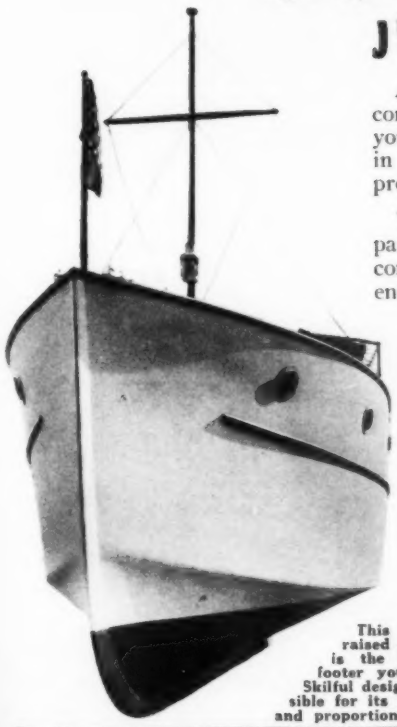
Advertising Index will be found on page 192

The Cruiser Sensation of 1922

$1500
Completely Equipped

DELANCO 27

The Delanco 27. Length 27'. Beam 8' 6". Draft 2' 6". Speed 9 miles



This V-bottom raised deck cruiser is the biggest 27-footer you ever saw. Skilful design is responsible for its perfect lines and proportions.

JUST think of it! A well designed, well built, well finished motor cruiser, equipped complete to the last detail, all for $1500.

A boat you can handle alone, big enough to entertain a party of eight or ten, complete enough for a month's cruise, fast enough to pass most of the cruisers you meet. An up to the minute V-bottom raised deck cruiser that lacks nothing in accommodations or appointments, furnished all ready to cruise at a real pre-war price.

The Delanco 27 is designed and constructed by experts. The plans were prepared especially by J. Murray Watts, the celebrated Naval Architect. The construction is carried on in our well organized boat building plant by experienced boat builders under expert supervision. Standardization and quantity production have cut the cost in two!

Delanco 27 is a good sea boat, staunchly built, easy driving, easily handled, dry and safe to navigate in any weather. Steam bent oak frames spaced 12" on centers, planked with white pine, well caulked above and below the water line,—these things insure a hull that will last a lifetime, and ride a gale without springing a leak.

You'll find the Delanco 27 your ideal of a small cruiser,—ideal in appearance, comfort, arrangement, equipment and service.

Delanco Shipbuilding Company

Delanco, N. J.

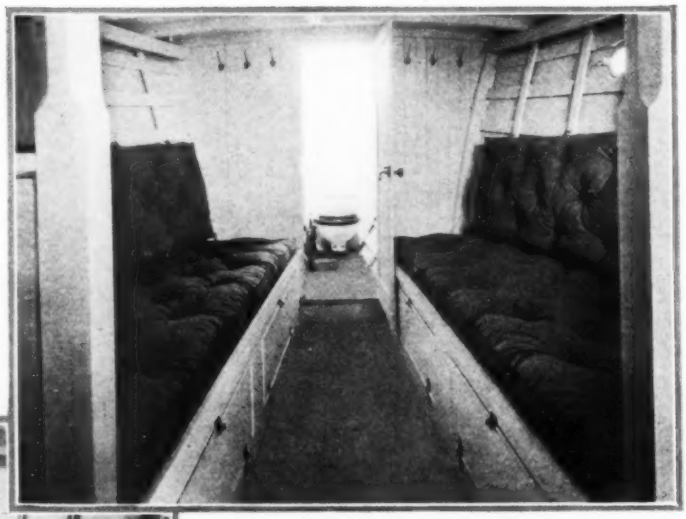
(On Delaware River near Philadelphia)

DELANCO 27 — A Summer Home

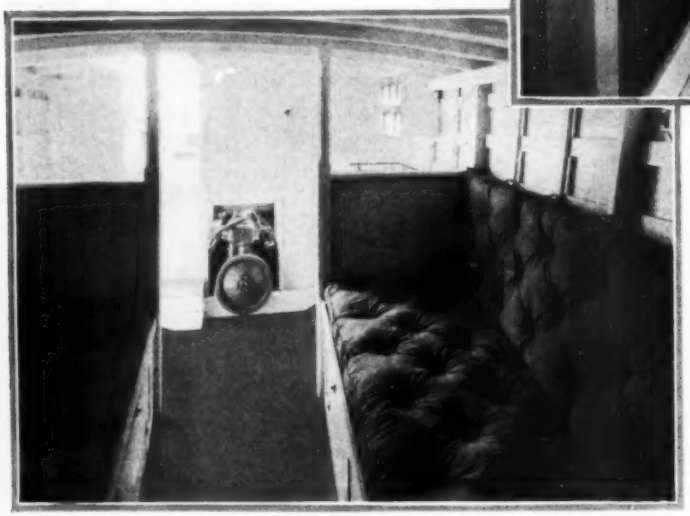
Cozy Comfort and Completeness Are Featured in this Cabin

YOU never saw such a complete, roomy and well arranged cabin in any cruiser under 32 ft. Main cabin is 6′ 8″ long, or 10 ft. long including the galley, finished in white. Headroom is 5′ 8″. Wide berths fitted with four thick serviceable khaki-covered cushions and backs mean comfortable sleep. A hatch forward, together with six large ports, keeps the cabin always cool and well ventilated.

Wide lockers under the berths and plenty of clothes hooks add to the convenience. The toilet is in a separate compartment, 3′ 4″ in length. A hatch over the toilet simplifies handling the anchor in rough weather. In the peak is the 15-gal. water tank, rope and dunnage space. A stout sampson post is an important feature.



Cabin looking forward

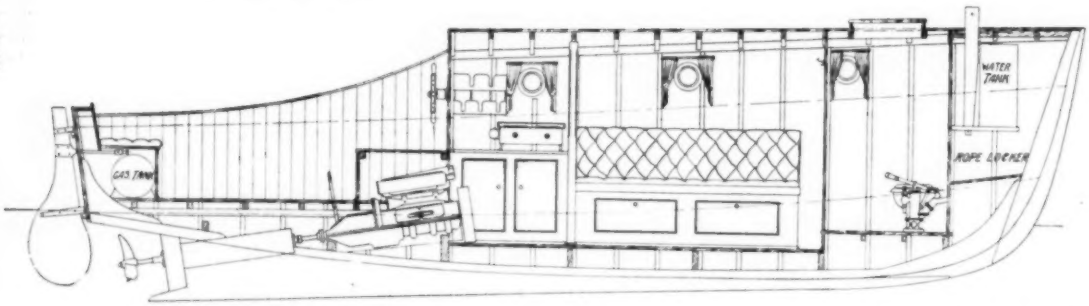


Cabin looking aft

THE motor is the popular Kermath 16 H.P. unit power plant with 5-plate multiple disc clutch, reverse gear, thrust bearing, Kingston carburetor, water pump, oil pump, etc. Ignition by American Bosch High Tension Magneto with impulse coupling makes batteries unnecessary.

Bronze propeller shaft and Columbian Wheel. Salt water fittings. Gasoline tank holding 32 gallons is under the seat across the after end of the cockpit.

We have supplied the Delanco 27 with every necessary equipment—nothing more to buy but gasoline.

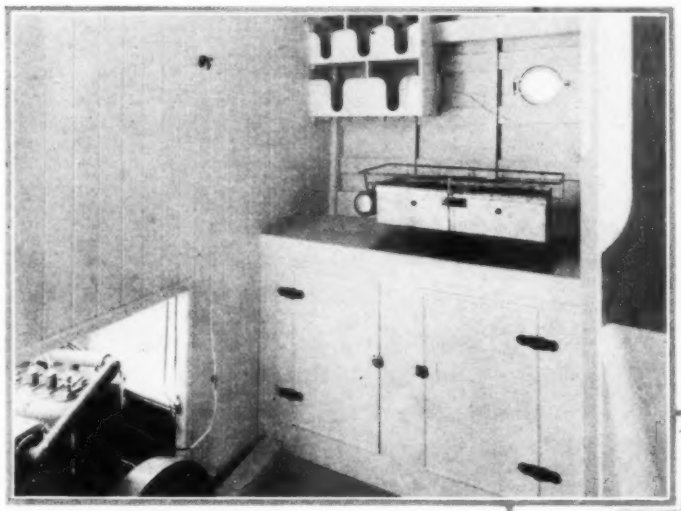


Study this arrangement and you will see what a complete little ship the Delanco 27 really is. We have forgotten nothing and crowded nothing to get it all into 27 feet, the biggest 27 feet of boat you ever saw.

Advertising Index will be found on page 192

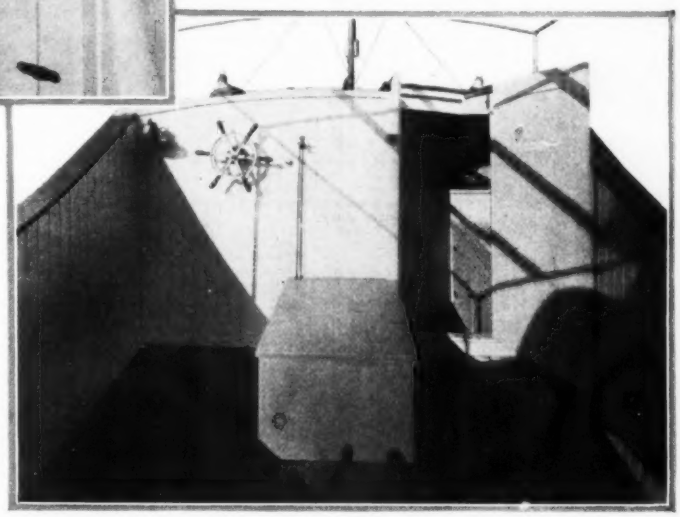
on the Water — DELANCO 27

Galley and Cockpit Are All You Could Desire



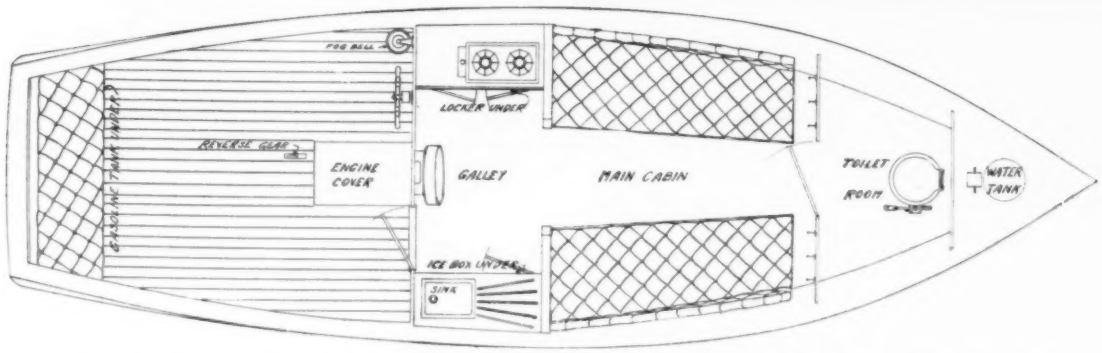
IT'S fun to cook in the Delanco galley, with everything at your fingers' ends. The two-burner gasoline stove is the famous "Kamp-Kook," with dish rack above and large provision lockers below. On the starboard side is a blue and white enamelled sink with running water, and ice box below. This galley location is most convenient whether you eat in the cockpit or in the cabin.

A big comfortable cockpit is vital—in the Delanco it is 9' 8" long with khaki awning overhead on strong galvanized stanchions, cushioned seat across the stern and plenty of room for additional chairs.



ALL motor controls are brought up to the wheel, with reverse lever in cockpit floor and a seat-height box over the motor which makes all motor adjustments accessible when removed. The cockpit is self-bailing, with floor several inches above the water-line.

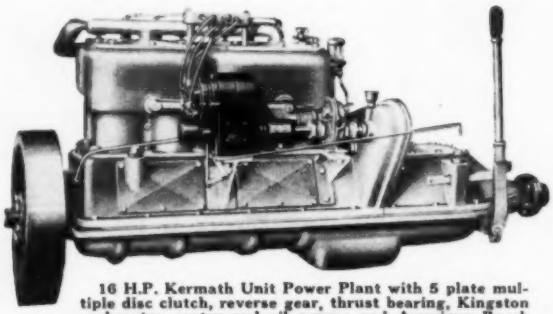
The canvas-covered deck forward is flat enough to work from, and its sawed deck beams make it strong enough to support several persons. An 8-ft. military mast with galvanized stays adds to the appearance.



Now, isn't this the kind of motor boat you want to own? The fuel economy and low cost of a small boat with all the essentials and comforts of a complete cruiser. They are perfectly combined in the Delanco 27.

DELANCO 27

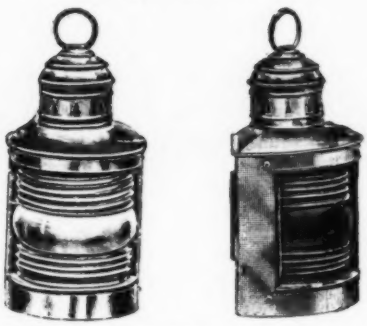
The completeness of the Delanco 27 design is equalled only by the completeness of its equipment. We supply everything you need, every fitting selected especially for its quality and suitability for this boat.



16 H.P. Kermath Unit Power Plant with 5 plate multiple disc clutch, reverse gear, thrust bearing, Kingston carburetor, water and oil pumps and American Bosch High Tension Magneto with impulse coupling.

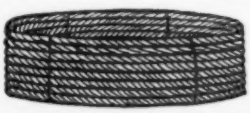
Liquid Compass

Two burner Prentiss Wabers "Kamp-Kook" Stove; burns gasoline with a hot blue flame that won't blow out in a 30-mile wind.



Galvanized running lights

Fog Horn



75 ft. 5/8" diameter manila anchor line

Brass Fog Bell

25 lb. Anchor

Laughlin "Victor" Yacht Toilet

Jack and Ensign on fore and aft flag staffs

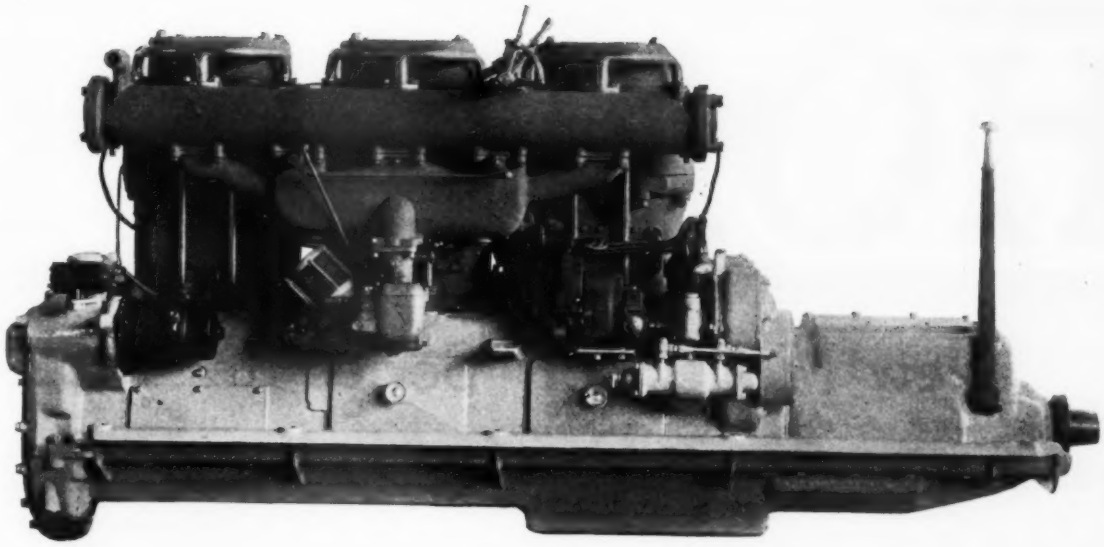
All this included with the Delanco 27 for $1500.00 complete (except tax).

Order now for Spring. Deliveries by water or rail, anywhere. Write today for detailed specifications.

Delanco Shipbuilding Company — Delanco, N. J.

(On Delaware River near Philadelphia)

Advertising Index will be found on page 192



The Trident Model

Medium and Slow Speed 6 Cylinders, 94 H.P.
Bore 5¾", stroke 6¾", 200 to 800 R.P.M.

In four years, gasoline has declined in grade from 68-70 degrees to 54-56 degrees—approximately 20%. Your motor, which may be showing results of poor fuel in increased wear of pistons and cylinders, hard starting, loss of power, now, what will it do next season?

Overhead Dual Valve STERLINGS were designed expressly to develop higher power on this poorer fuel. A horsepower is delivered on approximately 13% less gasoline. 13% off your fuel bills each year—does it interest you?

Motors are being exhibited at the Motor Boat Show, Grand Central Palace, February 17-25. Exhibitions also at many dealers, located in all principal waterside cities, with facilities for service. Literature on request.

Principal Dealers:

W. H. Moreton Corp., Boston, Mass.
Bruns, Kimball & Co., New York, N. Y.
Bruns, Kimball & Co., Philadelphia, Pa.
Unger & Mahon, Inc., Baltimore, Md.
Stauffer, Eshleman & Co., New Orleans, La.
J. N. Vernam, S. Jacksonville, Fla.
W. L. Masters & Co., Chicago, Ill.
F. G. Epton, Portland, Ore.
Atlas Gas Engine Agency, Seattle, Wash.
A. G. Hebgen, San Francisco, Cal.
Fellows & Stewart, Los Angeles, Cal.
Ferrier & Lucas, Vancouver, B. C.
Can. Motor & Yacht Co., Montreal, Que.
Canadian Beaver Co., Toronto, Ont.
Ditchburn Boats, Ltd., Gravenhurst, Muskoka.
St. Lawrence River Motor & Machine Co., Clayton, N. Y.

Sterling Engine Co.

1254 Niagara Street Buffalo, New York

12 to 600 H.P. High Speed, Medium Duty, Slow Speed

Where There's Work

HONEST

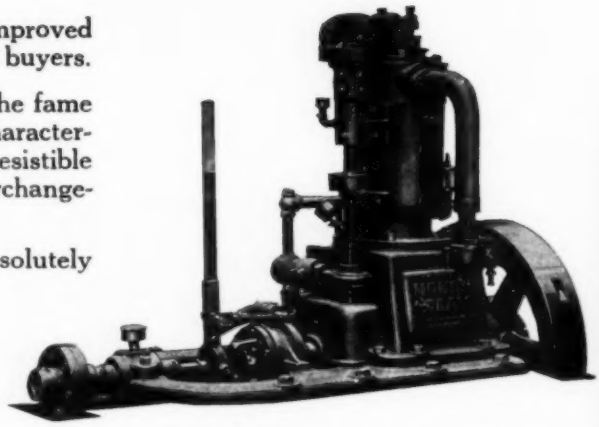
New Model "M" Series for 1922

HONEST CLAYS have been refined and improved both in appearance and operation for 1922 buyers.

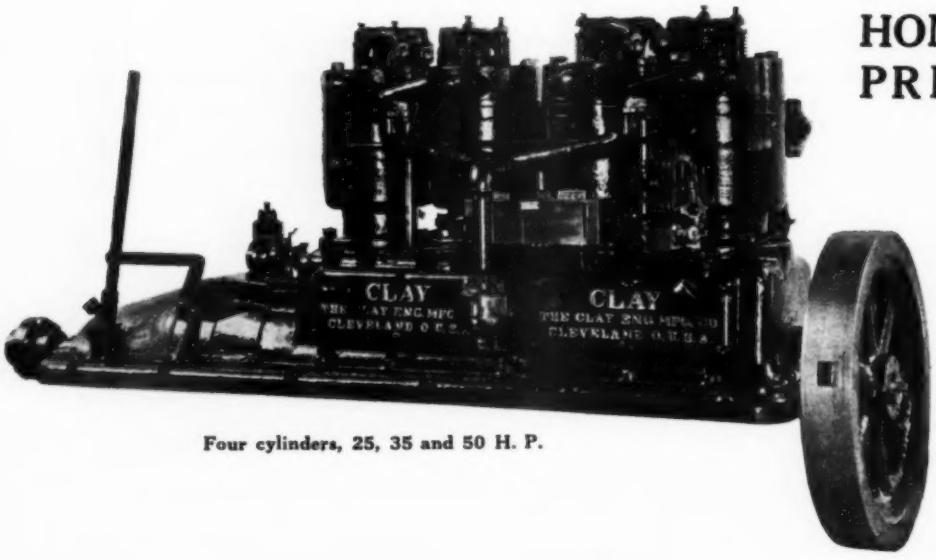
The new Series "M" will more than uphold the fame of Honest Clays. For we have added to the characteristic Clay qualities of rugged strength and irresistible power, a degree of standardization and interchangeability seldom found in a machine of this size.

All parts of the model "M" engine are absolutely standard and interchangeable.

Honest Clay is the engine for hard working commercial boats and heavy cruisers. It is built to last a lifetime of continuous heavy service.



Single Cylinder, 6, 8 and 10 H. P.



Four cylinders, 25, 35 and 50 H. P.

HONEST CLAY PRINCIPLES

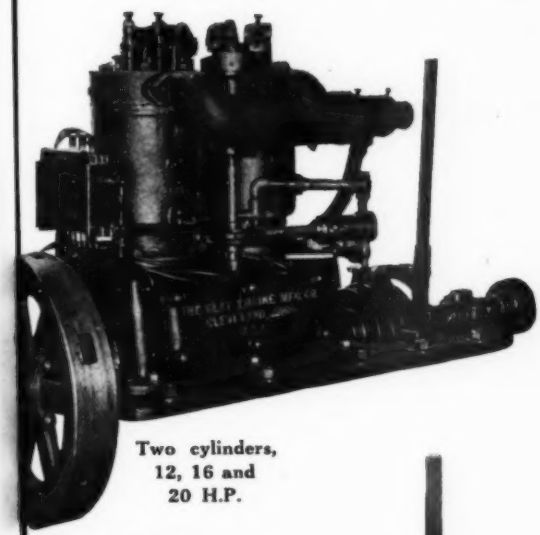
- Four Cycle
- Heavy Duty
- Slow Speed
- Valves in Head
- Mechanically Operated Valves
- Fuel Economy
- Rugged Construction
- Reliability
- Simplicity
- Long Life
- Satisfaction

Advertising Index will be found on page 192

to be Done — Get the

CLAY

Prices Reduced February 1st



Two cylinders, 12, 16 and 20 H.P.

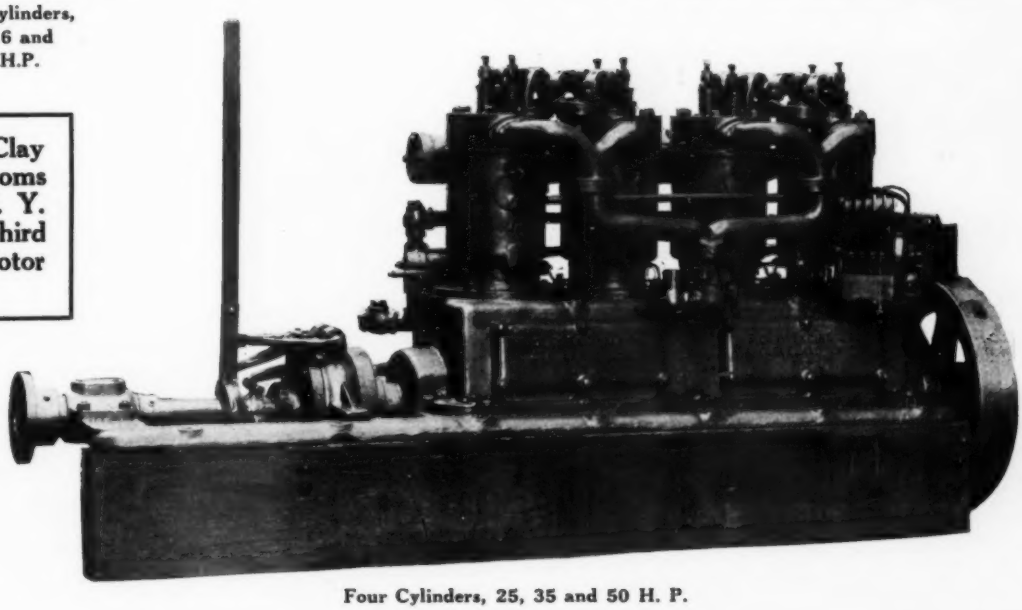
With new reduced prices in effect February 1st, we offer you a better engine with more equipment for less money.

Although the Model M is a new motor it is a perfectly logical evolution of the first Honest Clay built nearly 25 years ago. It shows the advantage of 25 years manufacturing experience and 25 years service experience.

Every Honest Clay is guaranteed to develop its full rated power on dynamometer test. What is more important, it will develop its full rated power in your boat after long years of hard service.

Write us today for catalog and prices

E the Honest Clay at the Show Rooms Sutter Bros., N. Y. tributors, 44 Third t., during the Motor t Show.



Four Cylinders, 25, 35 and 50 H. P.

THE CLAY ENGINE MANUFACTURING COMPANY

664 EAST 72nd STREET CLEVELAND, OHIO

LUNKENHEIMER
AUTOMOTIVE ACCESSORIES

It's a Good Name to Remember

WHEN a company has grown to be the largest of its kind throughout the whole world, you're pretty certain of the merit and uniform quality of its products.

Furthermore you can figure that volume production in a big completely equipped factory insures the lowest prices consistent with a quality product. Can you as a buyer afford to overlook the protection of such a guarantee?

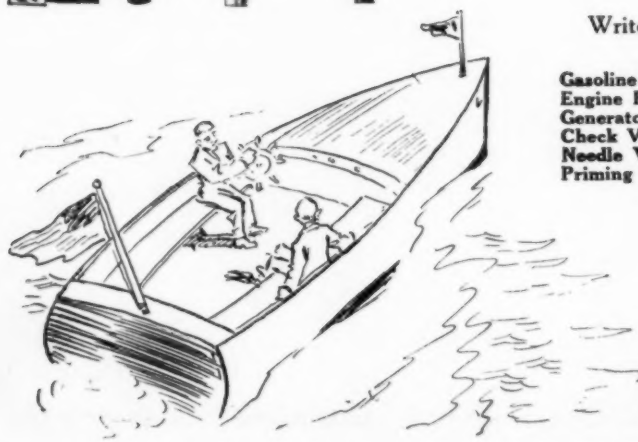
Specify LUNKENHEIMER

When in the market for automotive or engineering specialties of any kind, whether it's a little oil cup or a big steam valve, remember LUNKENHEIMER and specify this brand by name. No doubt many LUNKENHEIMER fittings are already used on your boat and engine.

Leading dealers everywhere sell Lunkenheimer Accessories. The best marine engine and boat builders are large users of Lunkenheimer products. You'll find we make just what you're looking for.

Write today for Catalog 5-CC.

Gasoline Strainers	Ground Key Cocks	Air Whistles
Engine Primers	Oil Cups	Whistle Valves
Generator Valves	Grease Cups	Air Pumps
Check Valves	Sight Feeds	Oil Pumps
Needle Valves	Oil Gauges	Tubing Unions
Priming Cups	Multiple Oilers	Bronze Fittings



THE LUNKENHEIMER CO.
"QUALITY"
LARGEST MANUFACTURERS OF
HIGH GRADE ENGINEERING SPECIALTIES
IN THE WORLD
NEW YORK CHICAGO CINCINNATI, U. S. A. BOSTON LONDON

EXPORT DEPT. 129-135 LAFAYETTE ST., NEW YORK

Advertising Index will be found on page 192

DENSMORE STANDARDIZED YACHTS

Length 73'
Beam 12'9"
Draft 4'0"

Length 36'
Beam 9'6"
Draft 2'8"

Wonderful is the opinion of yachtsmen who have seen the Densmore 73' x 12' 9" Cruiser. From stem to stern the best of materials and construction find their place in every detail and appointment.

While moderate in size and cost here is every convenience for living and comfort found in yachts of far greater dimensions

Seaworthy to a high degree and with a fair turn of speed

Densmore Standardized 36 Foot Cruiser

36'—3½" x 9'—6" x 2'—8"

Designed and constructed for the owner desiring beauty, seaworthiness and a small home afloat.

Gasoline is all you will require for your first cruise, for standard equipment includes bilge pump, flag poles, signal mast, fire extinguishers, lines, anchor, name and hail and license numbers, electric and kerosene running lights, fog horns, fog bell, electric horn, cushions for cabin and bridge seat, two upholstered pullman type berths, four fenders, compass, boat hook, mop, canvas pail, ice box.

She's ready to start at our dock when you call for her. or should you desire we can ship your boat for this winter's Florida use.

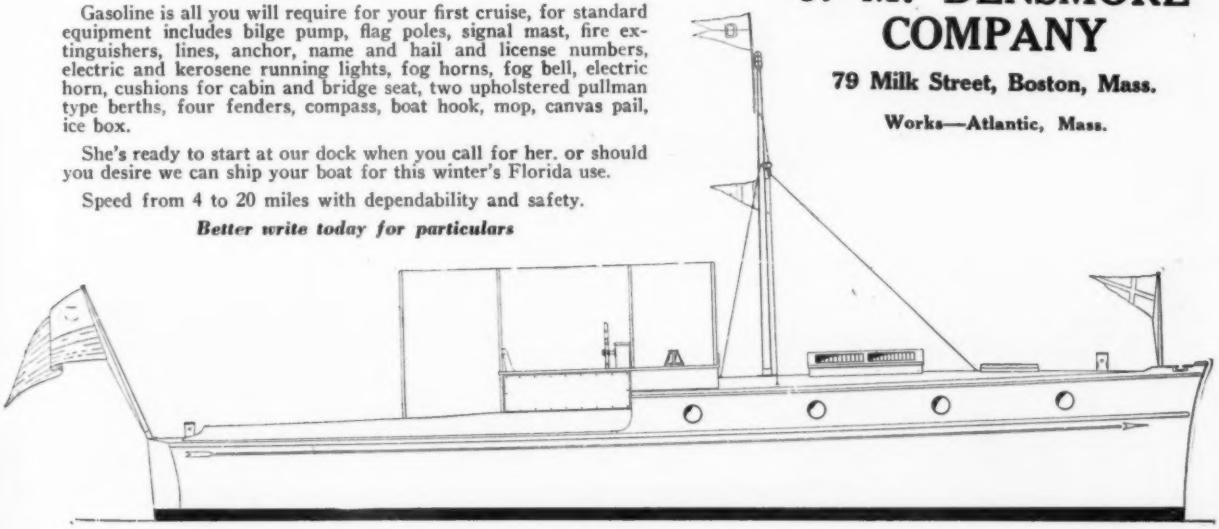
Speed from 4 to 20 miles with dependability and safety.

Better write today for particulars

J. M. DENSMORE COMPANY

79 Milk Street, Boston, Mass.

Works—Atlantic, Mass.

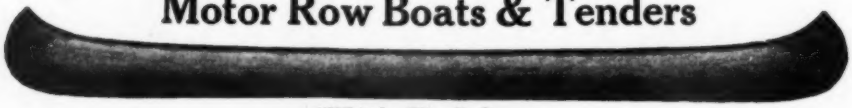


Trade Mark

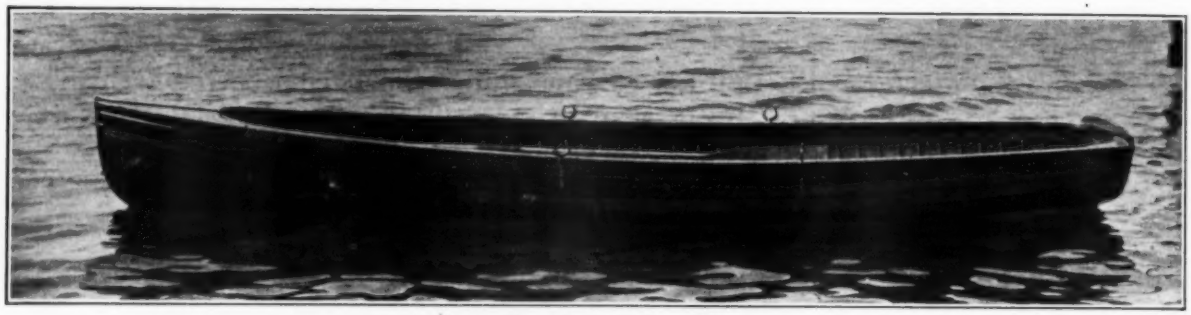
"Whistle Wing"

Trade Mark

Canoes—St. Lawrence Skiffs
Motor Row Boats & Tenders



"Whistle Wing" Canoe

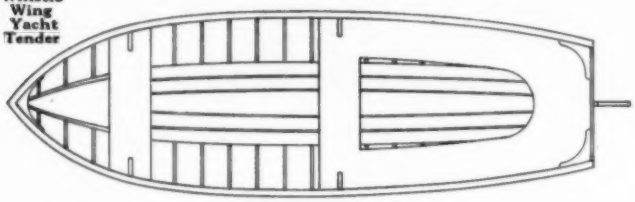


"Whistle Wing" Square Stern Rowboat

We show here cuts and photographs of some of our best known products. Each model has been given much care and thought in the designing thereof and we guarantee our workmanship and material second to none.

We are also turning out a very high grade Canvas Canoe.

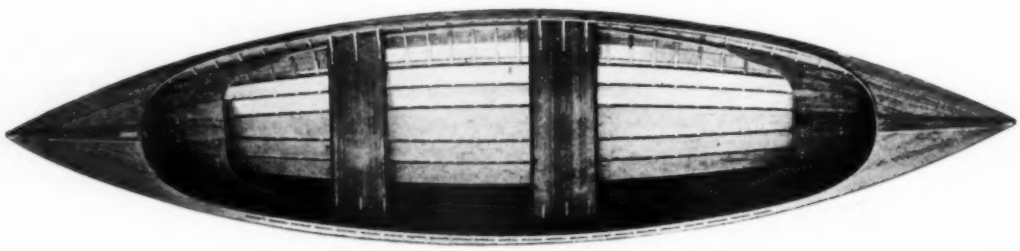
Whistle Wing Yacht Tender



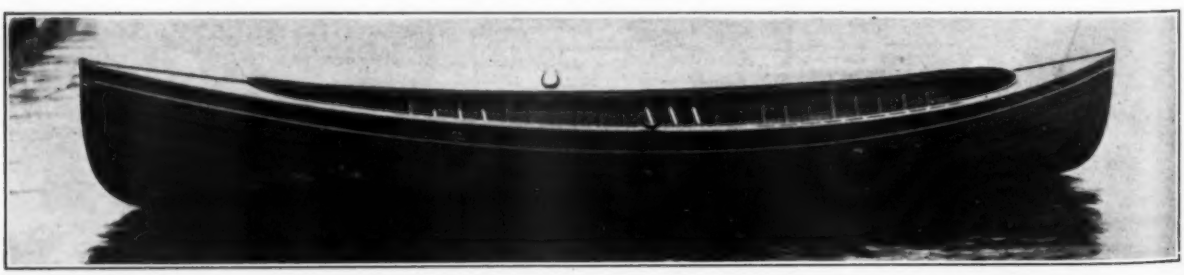
These products will be on exhibition in Space D-2 at the Motor Boat Show in New York City, February 17th to 25th.

If you are interested in small boats or canoes, we feel that it will pay you to get in touch with us.

ST. LAWRENCE BOAT WORKS, INC., Ogdensburg (on the St. Lawrence), N.Y.



"Whistle Wing" St. Lawrence Skiff



Advertising Index will be found on page 192

LET US TELL YOU

How important it is to Use

KIRBY PAINT

Because—

We have been Manufacturers of Marine Paint for more than Half a Century

We make a Full Line for Every Need of Motor Boats, Yachts and Boats of All Kinds

We make the Best of Quality and the prices give real and big value—a fact proven in the steady growth of our Business in the past fifty years,

Our paints are used extensively along the Atlantic Coast, from Maine to Florida

KIRBY FLAT YACHT WHITE
Popular with Every User

Our Specialties in Anti-Fouling Paints

GREEN AND RED YACHT COMPOSITE

OLD STYLE BROWN AND RED COPPER

and

NEW BEDFORD BRONZE
(Pure Copper and Anti-Fouling Liquid)

OTHER MARINE PAINTS WITH OUR REPUTATION

Once You Try—You'll Always Use

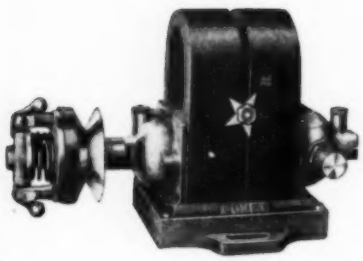
IMPORTED HOLLAND WHITE ENAMEL

GEORGE KIRBY JR. PAINT COMPANY

NEW BEDFORD MASSACHUSETTS

COMET

Boat Lighting Plants



Comet D. C. Magnetos

THE climax of 25 years' experience in building direct current magnetos for marine use. Their construction has been refined to the last word of perfection in every part and every detail.

Driven by friction pulley, plain belt pulley, or belt governor pulley. Designed for Make and Break, or for Jump Spark.

Ask for Bulletin 1 A

COMET Boat Lighting Plants are built in several sizes and combinations suitable for every size and type of pleasure and commercial boat, from the smallest open motor boat to the largest cruising yacht. Each Comet set has been designed by experienced electrical engineers fully conversant with motor boat requirements. Every Comet product is built in a factory devoted to boat lighting plants.

For smaller and medium size boats we furnish Comet Generators in 8 or 16 volts with 5, 10 or 15 ampere capacity. Driven by friction or belt with special governor pulley.

For larger cruisers, houseboats and yachts the 32-40 volt Comet plant is furnished in eight sizes with 12½ to 50 ampere capacity. We also supply 110-volt Generators or complete 110-volt Plants built especially to meet the conditions required by each installation.

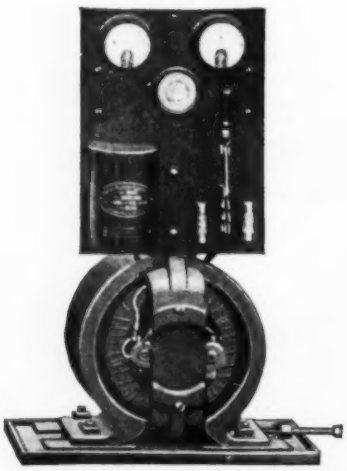
Details of generators, switchboards, capacity, drive, etc., are shown in our Bulletins. Ask for Bulletin No. 5.

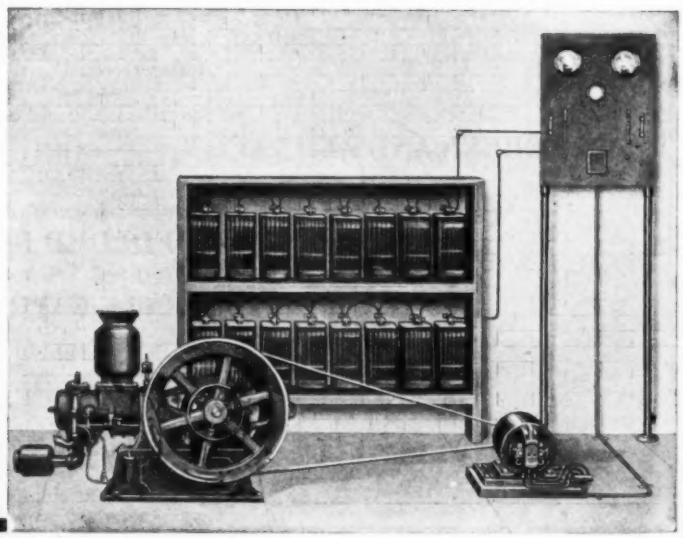
Write us the details of your boat and let us describe the proper Comet plant for you and tell you what it costs.

COMET ELECTRIC COMPANY

1241 St. Paul Street

INDIANAPOLIS INDIANA

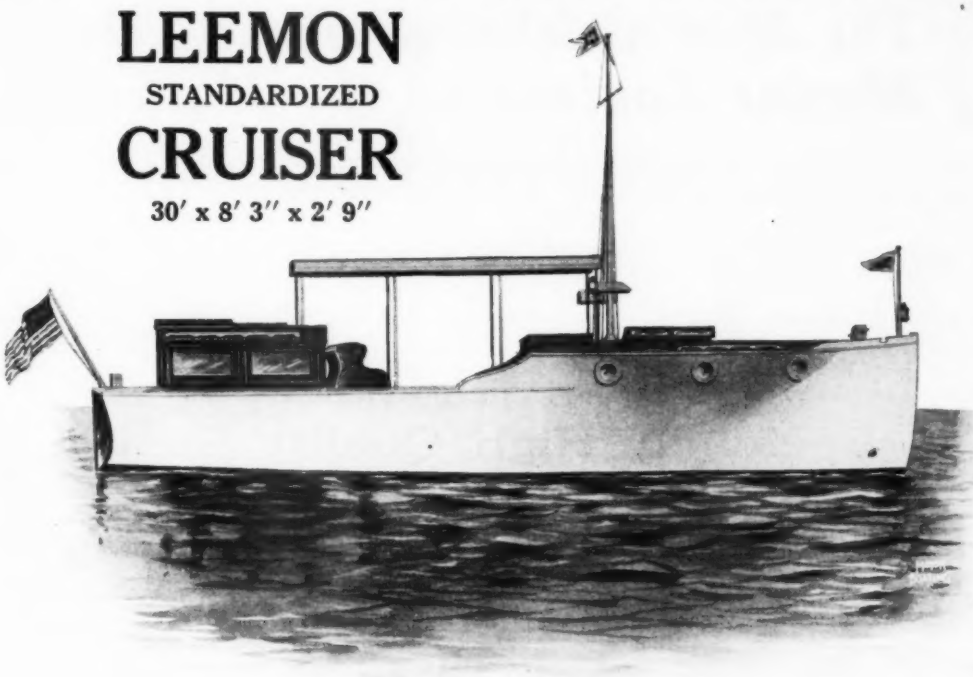




Advertising Index will be found on page 192

30 Feet of Comfort and Class

LEEMON
STANDARDIZED
CRUISER
30′ x 8′ 3″ x 2′ 9″



Solid Comfort and Honest Pride Go Hand in Hand for the Owner of a Leemon Cruiser

Speed 8½ to 17 miles per hour, according to power installed.

Sleeps four comfortably in forward cabin, full headroom. Separate toilet and large clothes lockers forward. Bulkhead with sliding door separates engine room from cabin.

Large bridge deck with comfortable seat and room for several wicker chairs. Self bailing, floor 12″ below deck line. Flush hatch over motor gives complete accessibility when raised. Large galley in trunk cabin aft. Full headroom. Portable table. Two 45 gallon fuel tanks, one on each side of engine below the bridge deck.

Exterior brightwork fine mahogany with brass hardware. Interior white enamel, mahogany trim. Underbody has three coats anti-fouling paint. Topsides three coats best Yacht White.

Planking 1¼″ cypress, copper riveted on oak frames, closely spaced and steam bent. Completely equipped with yacht toilet, lavatory, galley sink, fresh water and fuel tanks.

AS a source of recreation and pleasure, you are entitled to expect two things in your boat.

Real comfort is one of them,—comfortable sleeping quarters, comfortable living quarters, comfortable cockpit and galley. That means a double cabin boat with roomy accommodations, full headroom inside, and proper separation of galley, motor, main cabin and toilet.

Then you want a boat you can be honestly proud to own,—proud of its appearance, its beauty of finish and excellence of arrangement. That calls for skilful designing and master workmanship in the building.

ALL THIS WITHIN 30 FEET.

The standardized Leemon 30-footer is an all around boat. We call it a day cruiser because it has such a roomy cockpit and such careful arrangement that it can accommodate a large party without crowding or discomfort.

But you may call it a week-end cruiser, a speed cruiser, a fishing boat or a summer home, for it is equally suited for all of these purposes.

You'll like the Leemon 30-footer. It is the smallest standardized boat ever offered in the popular bridge deck type. It is just big enough to handle with maximum pleasure and minimum expense.

Price Reduced to $2800 without motor, completely equipped, including war tax.

Write today for catalog and full description.

LEEMON BOAT CO., Dept. 5. Cambridge, Maryland

PIERCE-BUDD ENGINES

The Most Celebrated Two Cycle Marine Engines on the Market

HERE is the engine for your speed boat, runabout, cruiser or work boat. A smooth running and reliable power plant that offers you years of dependable service at the lowest possible cost.

The famous Pierce-Budd engines are known the country over for their great efficiency, power, flexibility, economy, light weight and high speed. These engines have held and still hold the World's Records in their class since they were originally introduced in 1909. In the 1921 meet of the M. V. P. B. A. at Peoria the Pierce-Budd 150 cu. in. engine won in both the 150 and the 215 cu. in. classes.

Pierce-Budd engines have made successful and satisfactory boats out of hundreds of craft and have made good in all kinds of service. You will be pleased with the price, as well as the quality of construction and the kind of service you get.

A Decidedly High Quality Engine at a Decidedly Popular Price

(Sizes, One to Six Cylinders)

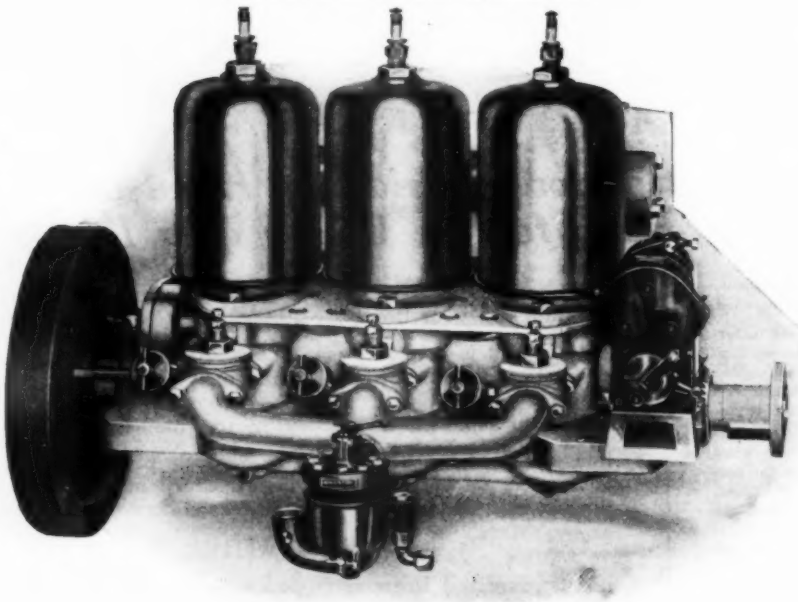
High Speed

Three cyl., 18-25 H. P. Weight 235 Pounds. Speed Range, 500 to 1800 R. P. M.

Aluminum is used for upper and lower halves of base, exhaust and intake manifolds and check valve cases.

Equipment

Bosch Magneto, Rotary Pump, Bronze Bevel Magneto Gears, Internal and Pump Gears. Float Feed Carburetor. Two and Three Port System.



Heavy Duty

Three cyl., 20 H. P. Weight, 360 Pounds. Speed Range, 300 to 1200 R. P. M.

Base and manifolds made of grey iron.

Equipment

Atwater Kent Timer and coil, Rotary Pump, Timer and Pump Gears all machined. Float Feed Carburetors. Three Port System only.

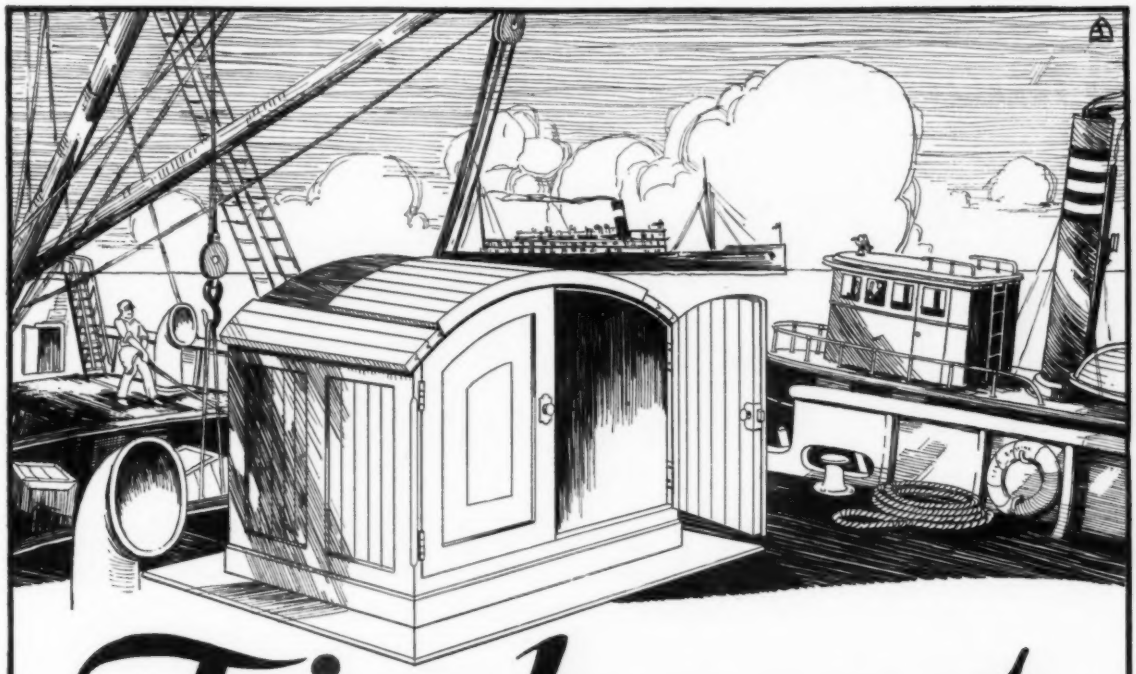
Both the high speed and heavy duty models have removable Brass Water Jackets extending below all ports and cooling the whole length of the cylinders. Best grey iron cylinders, 30-40 pt. carbon steel crankshaft, heat treated and ground to size. Best white metal journal bearings, fitted to a mirror finish. Interchangeable white metal crankpin bearings and interchangeable bronze wrist pin bearings. High grade construction in both workmanship and materials is evident throughout Pierce-Budd engines.

GUARANTEED to develop MORE than their rated horsepower. We guarantee to replace or refund your money on any Pierce-Budd engines returned defective within 30 days.

Write today for full details and prices. Territory open for dealers

J. H. PIERCE, 205 South Raymond Street, Bay City, Mich.

Advertising Index will be found on page 192



Tiebout

The name that symbolizes quality and service in

MARINE HARDWARE

From bow to stern, above-decks and below for ships, workboats, yachts and launches, we carry practically every item needed in brass and galvanized hardware and fittings. Also general supplies.

A chain is only as strong as its weakest link. There is no weak link in the well-balanced, carefully selected *Tiebout* line.

A trial order will make you a steady, satisfied customer.
Try us at once.

Prompt deliveries—reasonable prices.

W. & J. TIEBOUT

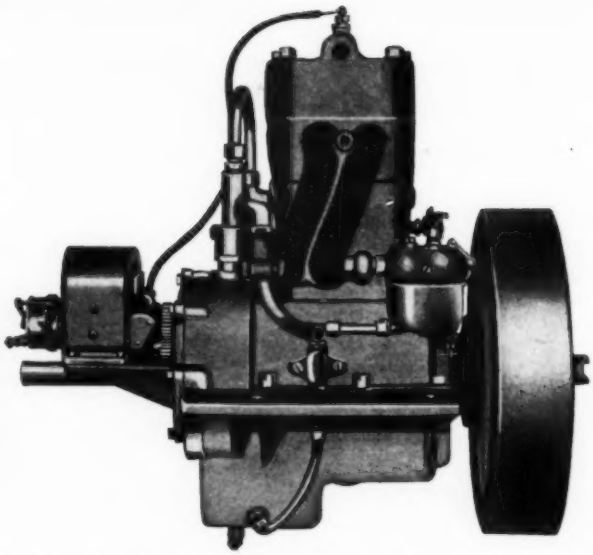
"Locks and Latches for Doors and Hatches"

118 Chambers St. **New York City**

Announcing

the new

HESS



"MONO-MARINE"

Now Manufactured by Hess Motors, Algonac, Mich.

Single Cylinder 4-5 H. P.

Four Cycle Marine and Stationary Equipment

SPECIFICATIONS.

Bore 3¼" *Stroke* 4"

Cylinder. Water jacketed and detachable from crank case.

Crank Case. In two parts, the upper half containing cam shaft, crank shaft, valve tappets, bearings and pumps.

Pump. Plunger style, operated within crank case permitting pump eccentric to run in oil bath. Bronze plunger, cold water packing.

Bearings. Both main and thrust bearings of phosphor bronze.

Valve Tappets. Enclosed and easily adjusted.

Fly Wheel. Unusually heavy, weighing 60 lbs. and measuring 14" in diameter.

Weight. 225 lbs.

Horse Power. 4-5 at 925 R. P. M.

Cylinder Head. Detachable, water jacketed.

Manifold. Hot spot, special design having exhaust and intake cast in one unit, assuring heated fuel being served to the engine, thereby permitting the use of low test petrol and paraffin.

Ignition. Dual Ignition consisting of timer, switch, spark coil and Bosch high tension waterproof magneto.

Carburetor. Kingston. Will idle at 100 R. P. M.

Crank Shaft. Made of 40-50 point carbon steel, counterweighted to effect perfect balance. Main bearings, 1½" diameter.

A HIGH grade four-cycle marine motor suitable for yacht tenders, runabouts, family launches, fishing boats and auxiliaries, as well as for stationary work. We have put excellent materials and workmanship into this engine and still it is so simple that it costs about the same as an ordinary two-cycle engine.

Replacements Everywhere at Low Cost

A very important feature of the HESS Mono-Marine is the fact that all such parts as pistons, piston rings, piston pin, connecting rods, valves, valve springs, timing gear, carburetor and coil points are interchangeable with the same parts used in the Ford motor. This insures quick replacement in any locality and the advantage of this feature is quickly recognized.

New Prices of the HESS MONO-MARINE

Effective January 1, 1922

Equipment T. $130.50	Mono-Marine Engine, complete with Kingston Carburetor, Spark Plug, Coil, Switch, Timer and Hot Spot Manifold.
Equipment M. T. $150.00	Same as Equipment T but with Bosch High Tension Waterproof Magneto. Equipment M. T. is the best as it is of the Dual Ignition Type.
Assortment A. K. $25.50	8 feet of bronze shafting. One set of flange couplings. Stuffing box. Stern bearing. Propeller.
Assortment A. C. $30.00	Same as assortment A. K. but instead of flange couplings a List One-way Clutch is furnished.
Assortment A. R. $65.00	Same as assortment A. C. but instead of One-way Clutch a Reverse Gear is furnished.

Write today for catalog

HESS MOTORS, Algonac, Mich.

Advertising Index will be found on page 192

"TOPAZ" "ROAMER"

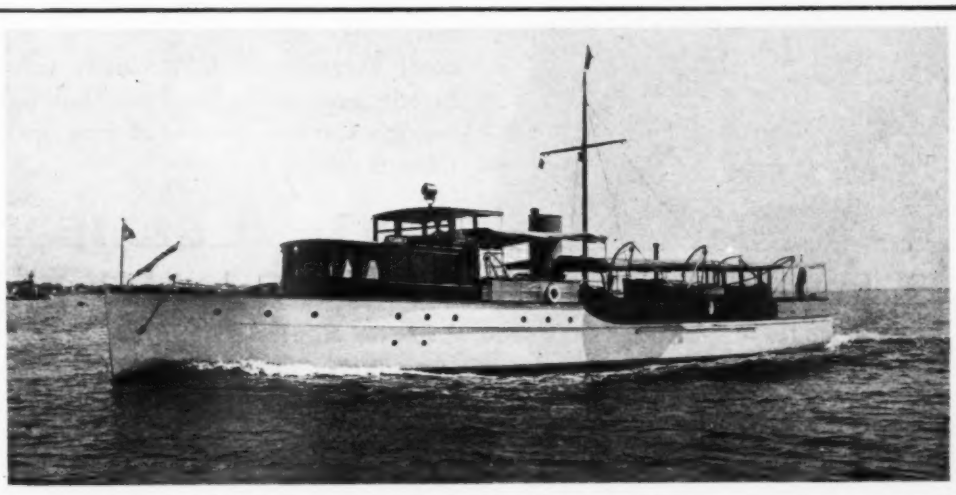
Frederic S. Nock

Naval Architect and Yacht Builder

The character of Nock designs and Nock construction is best shown by the class of yachts produced in this yard. Topaz and Roamer are two recent examples, typical of our productions.

We will be glad to figure on your new boat

EAST GREENWICH RHODE ISLAND



SKANEATELES BOAT & CANOE CO.

Builders since 1893

18 FT. O. A. KNOCKABOUT

Sail area 225 sq. ft. Beam 6′ 9″. Steel centerboard and rudder. Will stand a lot of wind and luffs readily without loosing the jib. Handles as easily as a cat boat. Excellent one design for clubs.

15 FT. CAT BOAT

This is a strongly built, but light cat boat with the conservative sail area of 115 square feet. It is very easily handled. Just the thing for a boy or girl to learn in. In great demand for summer camps.

SAILING SKIFF

Length 16 ft. Beam 4 ft. Sail area 100 sq. ft. Rows very easily and sails fast. Mast slips into galvanized tube. Steel centerboard in enclosed trunk. Strong enough for hard use, but light enough for two persons to pull up on a beach readily.

IT PAYS TO BUY BOATS OF QUALITY

Row Boats - Sailboats - Outboard Motor Boats - Dinghies

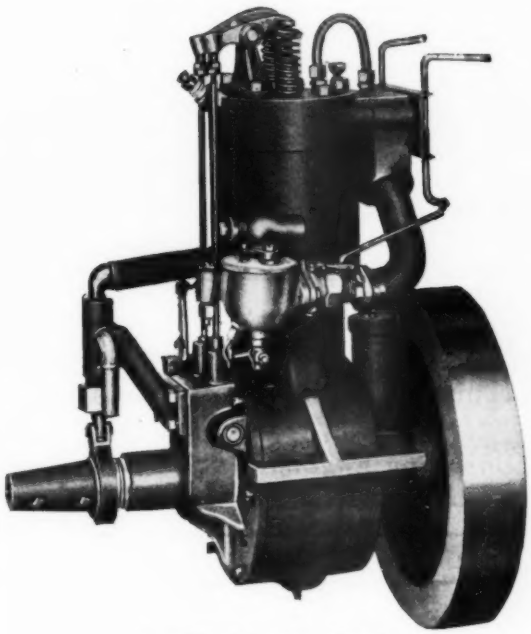
Persons who bought boats of us 15 to 18 years ago keep coming back for duplicates. These orders are receiving the attention of the same men who built our first boats.

GET YOUR ORDER IN EARLY **38 Jordan St., Skaneateles, N. Y., U. S. A.**

Advertising Index will be found on page 192

Michigan Marine Motors

Offer you an extra large measure of Economical Service in the 1922 Product



CARBURETOR SIDE

A demonstration will convince you that this motor stands in a class by itself—for sturdiness, reliability and economy.

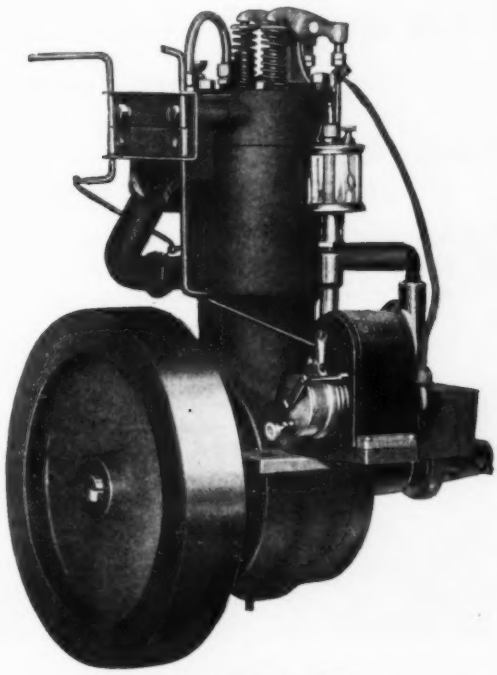
4½ H.P. 4-Cycle. Weight, 125 lbs.

Outfit "A" complete with Bosch Magneto $135.00

Outfit "B" complete with water-proof Timer, Battery & Coil..$115.00

F.O.B. Detroit, Mich.

Many parts of this motor are interchangeable with Ford Motor parts. Repairs at any Ford Service Station.



MAGNETO SIDE

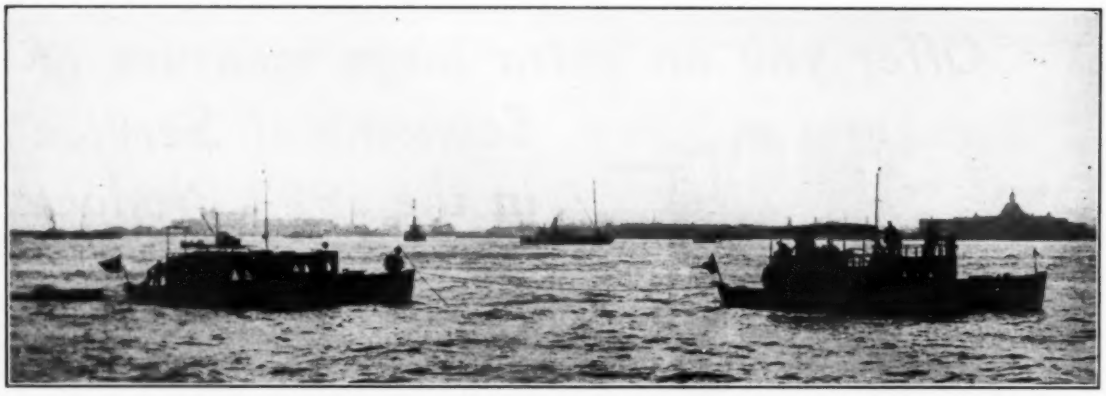
See our Motor at the New York Show

Michigan Marine Motor Corp.

7237 East Jefferson Avenue

Detroit, Mich.

Application of Electricity to Marine Transportation



First Application of Power for Propulsion Distributed by Electricity Between Vessels in Convoy. Yachts "DAWN" and "NEW ERA" Have Cruised over 6,500 miles.

ELECTRICITY afloat leads the way in Safety, Reliability, Comfort and Economy, as applied to day cruisers, yachts, house boats and commercial vessels.

William T. Donnelly, Consulting Engineer
17 Battery Place, N. Y.

Dawn Boat and Shipbuilding Corporation
Clason Point, New York City

Builders of

POWER BOATS, YACHTS AND WORKING BOATS FOR

The Nonsinkable Electric Cruiser "Lightnin" and the Famous Electric Yachts "Dawn" and "New Era" were built by us.

GASOLINE
DIESEL OR
ELECTRIC DRIVE

"LIGHTNIN." Smallest electric cruiser afloat. Electricity will give you best power for propulsion, clean heat for cooking, bright light at night and will make yachting a pleasure all the time and everywhere you go.

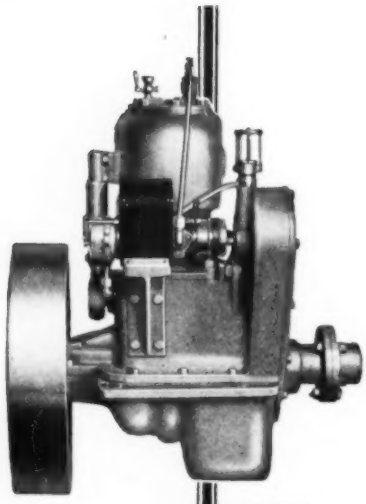
See "Lightnin" at Dawn Boat and Shipbuilding Exhibit at National Motor Boat Show, New York, February 17 to 25.

Advertising Index will be found on page 192

KERMATH

ENGINES
For
1922

The
WORLD'S
STANDARD
MARINE
MOTOR



4 Cycle
1 Cylinder
3 to 4 H. P.

Let Your Next Kermath — The Marine

THE KERMATH marine motors are famous throughout the world. You'll find them operating in the waters of every civilized country under the sun.

The Kermath standard, 4 cycle, 4 cylinder engine is used today by over 80 percent of the leading boat builders of the world as standard equipment. Could you ask for stronger endorsement?

We particularly call your attention to the experienced individual boat owner. He is one of the strongest Kermath boosters. Having tried all types of motors, he finally settles on the Kermath as the only one he can always depend upon under all conditions to serve him 365 days in the year—year in and year out.

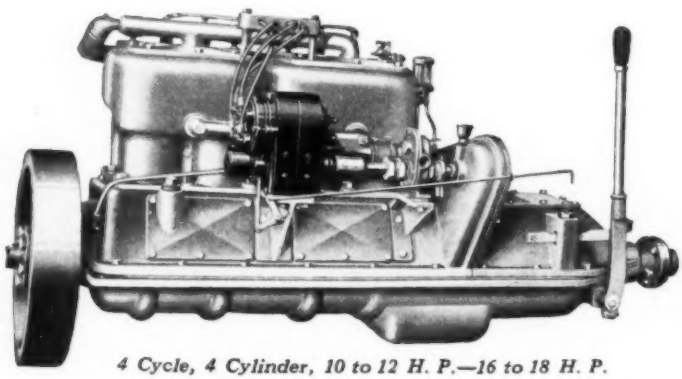
For example, Martin Welch of Winthrop, Mass., writes: "The Vanadium 20 H. P. Kermath which I purchased last May has run continually since installed, covering over one thousand miles without a single skip. Recently ran about seventy-five miles, using only eighteen gallons of gas, and made it in eight hours without a stop. Cannot say too much about the smoothness and efficiency of this engine."

Jay Gould of Lake Geneva, Wisconsin, states: "The 16 H. P. Kermath motor I bought last fall was a dandy. Ran it from Kenosha, Wis. to Mobile, Ala. on only 200 gallons of gas. Didn't even have to clean the spark plugs on the whole trip! This motor was installed in a 26-foot raised deck cruiser!"

John Law Kerr of Useppa Island, Florida, writes: "It may interest you to know that the Kermath that is now installed and is giving such wonderful service, is the same rebuilt engine that you sold me in 1917! It was the pioneer Kermath around here, and has since been sold twice, and is still giving excellent service."

L. W. Kelsay of New York City writes: "I wish to buy a 12 H. P. Kermath to replace one of your engines that has been doing service in my boat since 1911! This is ten years' service this fall. My present engine is still in perfect running order. I cannot speak too highly of this really marvelous marine motor."

Stanley M. Turlington writes: "My 16 H. P. Kermath has been constantly at work since 1919. Four months of this time she ran from 40 to 60 miles per day to the fishing grounds. The other eight months she operated every day on pleasure trips and on top of this during the latter part of 1920, we had her coupled up to a force pump, pumping



4 Cycle, 4 Cylinder, 10 to 12 H. P.—16 to 18 H. P.

"A Kermath always runs"

Advertising Index will be found on page 192

Motor Be A World's Standard Motor

piling for a toll bridge. In other words, she has been constantly at work night and day, and we have not had one moment's trouble with her."

A. E. Heilbron of San Antonio, Texas, writes: "The Kermath I purchased from you has measured up in merit in every statement that you made. It is a very energetic, capable motor and eminently reliable, and has given me continuous and uninterrupted service. I cannot speak too highly of it."

And so we could go on. In fact, if space would permit, we could quote hundreds of such letters. The above are merely taken at random from letters that come in daily.

Kermath popularity is due to their reliability under all conditions. Their first cost is very low, and they are very economical to operate. No matter what the conditions, they always run. With good care, they will last for years.

So, if you are about to purchase a new motor, we suggest you investigate the merits of this motor before you place your order.

The latest Kermath success is the 3 H. P. one cylinder engine that sells for only $135 with Bosch Magnetc and impulse coupling. If you operate a smaller boat, this is just the power plant you need—small, compact, very powerful and a regular bear for work.

This is a very popular model, and is selling as rapidly as we can produce them.

Other equally well known Kermath motors are the two cylinder, 4 to 5 H. P. and 6 to 8 H. P. units.

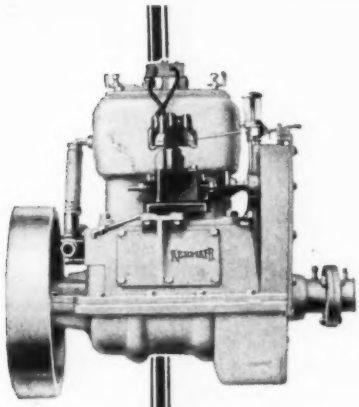
These are for slightly larger boats. They have been standard for years with the leading boat builders of the country.

Then, there are the 12 and 16 H. P. models—still larger, more powerful and very economical, and with the same Kermath stamina and reliability.

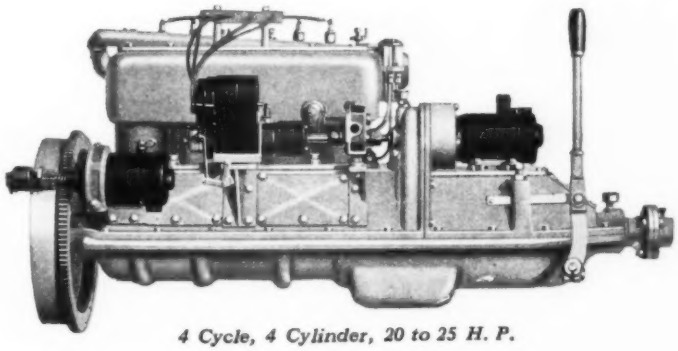
The famous Vanadium "20" which runs into still greater horsepower is a very efficient design.

The great Kermath "40" is a giant for work, and is found in many of the best power boats in this country and abroad.

No matter which Kermath model you select, if it is the type that fits your boat, you can be assured of the most efficient service, bulldog staying qualities and economy in operation at all times.

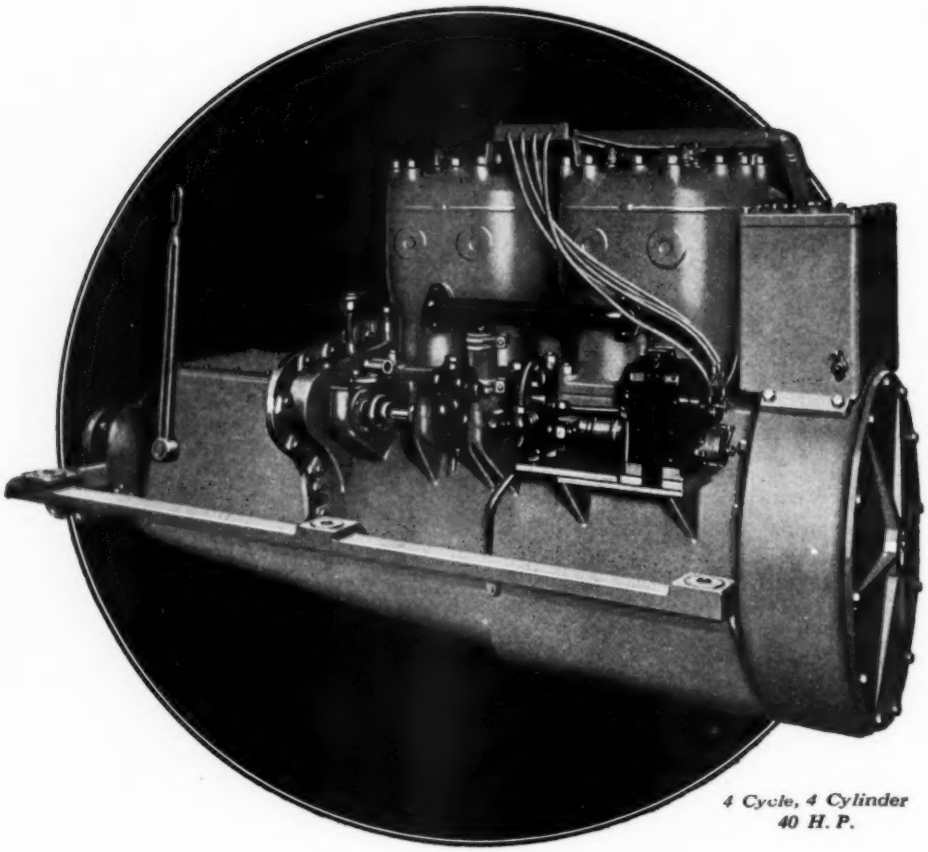


4 Cycle
2 Cylinder
4 to 5 H. P.
6 to 8 H. P.



4 Cycle, 4 Cylinder, 20 to 25 H. P.

"A Kermath always runs"



4 Cycle, 4 Cylinder
40 H. P.

Following is the greatly reduced Kermath price list for 1922. We cannot guarantee the length of time these prices will be in effect. But they are in effect now and if you place your order now (spring delivery if you wish) you will save money.

Write us at once for full description and further details of the entire Kermath line.

3 H. P.	$135	16 H. P.	$ 475
4 to 5 H. P.	270	20 H. P.	510
6 to 8 H. P.	290	40 H. P.	1,550
12 H. P.	445		

See the line of Kermath motors at the Motor Boat Show—Block E—Grand Central Palace, New York.

KERMATH M'f'g Co.

DETROIT MICHIGAN.

5880 Commonwealth Avenue

"A Kermath always runs"

Advertising Index will be found on page 192

Vibration

in marine engines Will Be Eliminated by the Engine Makers

WHEN

the purchasers insist upon freedom from this unnecessary annoyance

MOTOR boat enthusiasts who visit our booth (No. 80—second floor) at the Motor Boat Show, in New York, will be given a practical illustration of the advantage of a balanced crankshaft and flywheel.

They will be shown how a crankshaft can be balanced, in the manufacturer's plant, in a few minutes' time, to absolutely eliminate vibration.

Commodore Greening in Rainbow I., twice winner of Fisher-Trophy races.

Commodore HARRY B. GREENING, the original owner of Rainbow I, appreciated the value of freedom from vibration.

Following the winning of the FISHER-TROPHY RACES in Detroit, in 1920, he wrote us:

"I must admit that the balancing on the crankshaft and flywheel of the engine which I used in the 'Rainbow' was an excellent piece of work. Everyone who has ridden in Rainbow remarks on the absolute absence of vibration.

"I suppose you have heard that she won the Fisher-Trophy races this year, and I must admit that the engine ran magnificently and absolutely without tremor."

The NWA Balancing Machine will enable any marine engine manufacturer to accurately balance crankshafts and flywheels.

The cost of balancing, even with a small output, is ridiculously low.

Write for new booklet "Eliminating Vibrations."

VIBRATION SPECIALTY COMPANY

N. W. Akimoff, President

Harrison Building Philadelphia, Pa.

WE SOLVE VIBRATION PROBLEMS

Trade Mark Registered

MoToR BoatinG Books for Boatmen

All Published by MoToR BoatinG—All Non-Technical and Authoritative

MOTOR BOATING PRACTICAL HANDBOOKS—6 VOLUMES

Volume I —Practical Motor Boats and Their Equipment.....$1.50
Volume II —Practical Motor Boat Building..... 1.50
Volume III—Practical Things Motor Boatmen Should Know..... 1.50
Volume IV—Practical Marine Motors..... 1.50
Volume V —Practical Motor Operation and Maintenance..... 1.50
Volume VI—Practical Suggestions for Handling, Fitting Out and Caring for the Boat..... 1.50

The books measure 7 x 10 inches and are handsomely bound in cloth. Over 1,000 pages. Price of Practical Handbooks $1.50 per volume or $7.50 per set of Six Volumes.
Send for circular completely describing these books.

Foreign postage: $1.00 extra

THE IDEAL SERIES

Volume I—Designs of Ideal Motor Boats and How to Design a Motor Boat.....$2.00

This volume describes in detail how to design a motor boat. It also contains complete plans of 30 Cruisers, Runabouts and Auxiliaries. The plans include lines, table of offsets, interior plans, profiles, construction details, etc. There is no book published at the present time which describes in everyday language the details of designing a boat according to your own tastes. The plans of Ideal Cruisers, Runabouts and Auxiliaries are complete in every particular. They include the best of the plans published in MoToR BoatinG during the past several years. The plans include boats of from 20 feet in length up to 40 feet. The drawings are all to scale and large size.

Volume II—How to Build Sixteen Ideal Motor Boats $2.00

This book gives complete information for building the following boats:

10-foot mark boat, 12-foot outboard motor boat, 12-foot speed boat, 12-foot bangabout, 13-foot sea skiff, 16-foot sharpie, 18-foot runabout, 20-foot monoplane, 20-foot hydro-runabout, 20-foot knockabout, 20-foot tunnel stern, 22-foot V-bottom runabout, 25-foot V-bottom cruiser, 25-foot round-bottom cruiser, 28-foot cruiser (Consort II).

Every article is fully illustrated with working drawings and no information or instructions are missing which would be of assistance to the novice to build his own boat.

Both of the Ideal Books are printed in large type on extra fine paper. They have been edited by Charles F. Chapman, editor of MoToR BoatinG.

Price of Ideal Books, $2.00 per volume or $5.00 per set of 3 volumes.

Foreign postage: 50c

Ideal Series, Vol. 3
Twelve Complete V-Bottom Designs
by William H. Hand, Jr.

Plans Prepared Expressly for MoToR BoatinG

This new book is the most valuable ever published for the amateur builder or anyone desiring to have a V-bottom boat built by his own builder.

The plans contain outboard profile, lines, inboard, construction and interior arrangement plans, sectional views and complete table of offsets. Accompanying each design is a description of the boat and a full set of specifications taking up step by step each feature of the boat's construction, how it should be built and the proper material to use.

Plans and specifications of the following boats are included: **Edith, a 15-foot runabout; Jane, an 18-foot runabout; Katharine, a 30-foot cruiser; Dorothy, a 25-foot runabout; Zenith, a 25-foot cruiser; Cyclone, a 36-foot auxiliary; Eclipse, a 40-foot express cruiser; Magnet, a 28-foot cruiser; Tornado, a 45-foot auxiliary schooner; Broncho, a 29-foot cruising runabout; Shark, a 21-foot utility runabout; Claire, a 36-foot express cruiser.**

Price of Twelve Complete V-Bottom Designs . $2.00

(If ordered with the 2 other volumes of the Ideal Series, the price of the 3 books will be $5.00.)

Twenty Easy-to-Build Motor Boats

A New Book of Small-Boat Plans and How to Build Them

Volume IV Ideal Series

By William J. Deed and others

America's Foremost Small-Boat Designers

(Ready Now)

These plans have been prepared especially for MoToR BoatinG and are complete in every particular. They are in detail enough to permit building from direct, either by the amateur or professional builder. No part of the boat's design or construction has been omitted or slighted.

Read the contents: Chum, a 16-foot Motor and Sail Craft; a 9-foot Easy-to-Build Dinghy; Nomad, a 34-foot Cruiser; a 9-foot Sharpie; Porpoise, a 20-foot Auxiliary Cat Boat; Kingfisher, a 14-foot Fishing Skiff; Shrimp, a 25-foot Hampton Boat; Flattie, a 16-foot Utility Boat; Dolphin, a 34-foot Tunnel Stern Cruiser; a 9-foot Dory; an 8-foot V-Bottom Tender; Penguin, a 25-foot Auxiliary Sloop; Sea Gull, a 41-foot Auxiliary Schooner; Whale, a 20-foot Cruiser that's a Real Cruiser; Tarpon, a 29-foot Raised Deck Cruiser; Alligator, a 28-foot Tunnel Stern Cruiser, a boat that will run in water little deeper than a heavy dew and Mud Turtle, a 36-foot Stern Wheel Motor Boat. Rookie, a 20-foot Auxiliary Sloop; Nautilus, a 40-foot Tunnel Stern House Boat; Victory II, the Cruising Champion; Complete Bills of Material for Building.

Book is printed in large type, on fine paper, and handsomely bound in cloth.

Price of Twenty Easy-to-Build Motor Boats.. $2.00

If ordered with other three books of Ideal Series, price of all four books..... $6.00

Prices for all books of Practical Series, Ideal Series and V-Bottom Designs. Ten books in all.

If Purchased Separately.....$17.00 If ordered all at one time.....$12.00

All Books, 36 charts, log sheets and binder. Ordered together $16.00

Foreign Postage $1.50 extra.

(See advertisement of charts and log book elsewhere in this issue)

MoToR BoatinG, 119 West 40th Street, New York

Advertising Index will be found on page 192

Richardson BOATS

SCOUT—Standardized 26-Footer

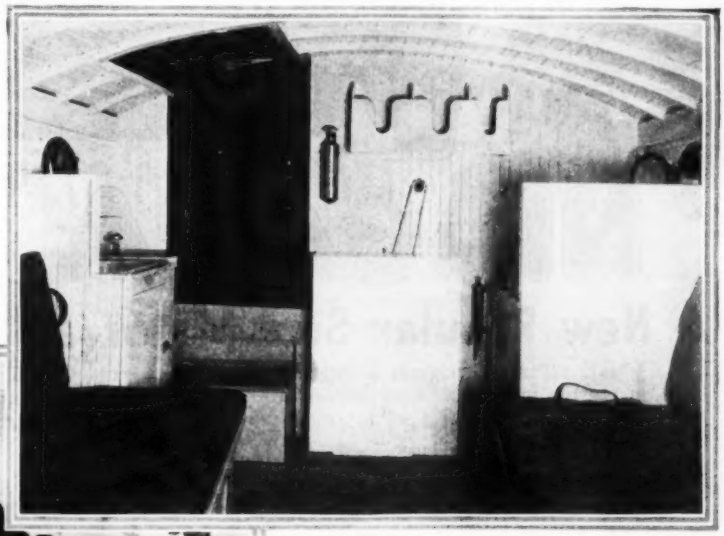
YOU'LL never know all the fun and comfort that can be crammed into a 26 foot cruiser until you have seen SCOUT. It's a real boat, the most complete 26-footer ever built. The ideal family cruiser, the ideal boat for week end parties, for a summer home on the water, for Florida cruising. The speed of 9-10 miles per hour means an interesting trip, wherever you cruise.

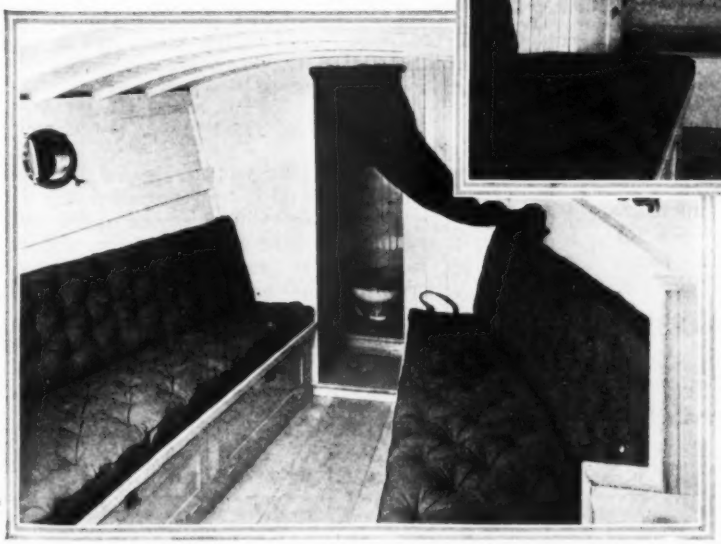
SCOUT is a handsome little ship, sturdy and seaworthy, well designed and excellently constructed. Its accommodations are unusually complete and free from crowding. It meets every requirement for a party of four on an extended cruise. For day trips there's room aplenty for eight or ten.

SCOUT is easy to handle, economical to run and simple to maintain. It is furnished with complete cruising equipment and a good motor so the price covers your entire outlay for the season, except gas and oil.

26′ x 8′ 6″ x 2′ 6″ large cockpit. Roomy cabin with toilet, galley, and berths for four. Full headroom. 4 cycle 12 H. P. motor with reverse gear. Speed 9-10 M. P. H.

Price $2,500 complete.





Write today for complete specifications and plans. SCOUT will open your eyes to the possibilities within 26 feet. Arrangements must be made soon if you want spring delivery.

Richardson Boat Company

370 Sweeney Street, North Tonawanda New York

We also furnish K. D. frames and complete boats in any size, runabouts or cruisers. Let us quote prices.

Back to "Normalcy"

NIAGARA "SPECIAL"

A New Popular Size Motor at a New Popular Price

THE return to normal demands, normal prices and normal production costs means a new era in marine motors. The NIAGARA "Special" is a wonderful little engine that has quickly taken its place as one of the best selling, most popular marine power plants ever announced.

NIAGARA "Special" is a highly refined four cylinder unit power plant suitable for ALL OPEN BOATS, for SPEED RUNABOUTS, for all kinds of COMMERCIAL BOATS, and for CRUISERS up to 30 or 32 ft. It means a new kind of power service for owners of SMALL and MEDIUM size craft,—better economy, smoother operation, less vibration, greater flexibility, easier starting, less trouble, lower maintenance cost.

This engine possesses all the advantages of the larger four cylinder motors. And it costs no more than any well built single or double cylinder engine of the same power. It is built for hard marine service, and develops its rated power continuously under load whether you run it at 500 or 1800 R.P.M.

Prices $235 to $330 Complete with Equipment

Let us send you the details and specifications of NIAGARA "Special" and its equipment. Its quality, value and price appeal alike to the boat owner, the boat builder and the engine dealer. Write today.

Agency Allotments Now Being Made. Don't Delay.

Other Niagara Models. For all types and sizes of boats.
2 cyl., 4 cyl., 6 cyl., 8 cyl., 5-14, 20-35, 35-60, 60-120, 80-180 Horsepower

NIAGARA MOTORS CORPORATION, 206 Niagara Boulevard, Dunkirk, N.Y.

Advertising Index will be found on page 192

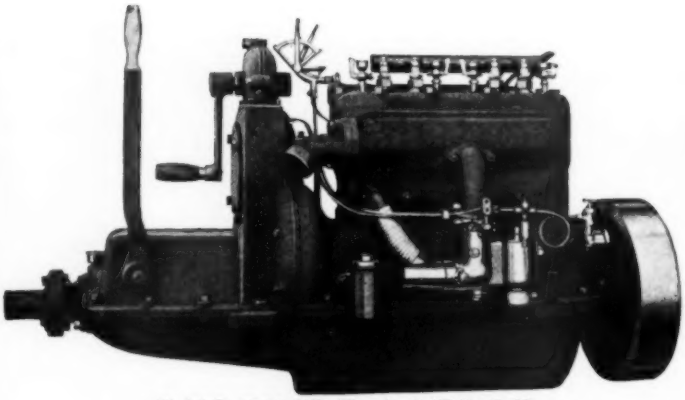
WITH reverse gears, as with all other products, experience is the greatest teacher.

¶ The combined experience of more than Thirty prominent Marine Engine Manufacturers has led each of them to standardize on one Reverse Gear. Thereby they have slightly added to their total manufacturing costs, but tremendously increased the dependability of their complete units.

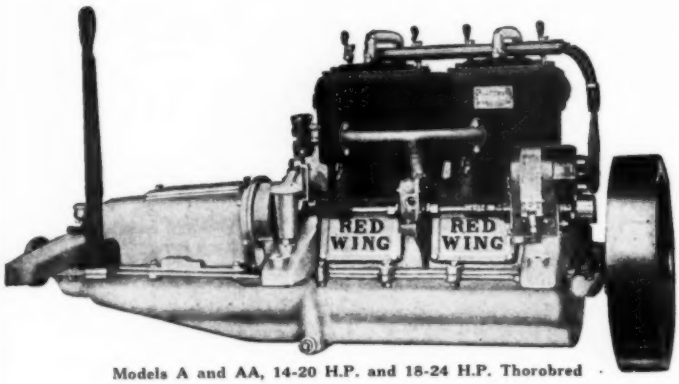
¶ YOUR boat should be equipt with this dependable gear to be safe.

(*Continued on page* 191)

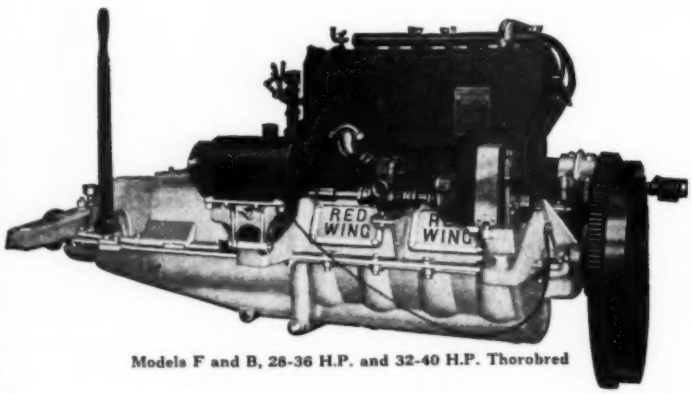
Red Wing Thorobred
THE MOTOR WITH POWER TO SPARE



Model D 10-14 H.P. Thorobred "Baby Doll"



Models A and AA, 14-20 H.P. and 18-24 H.P. Thorobred



Models F and B, 28-36 H.P. and 32-40 H.P. Thorobred

At Least Investigate!

IF you are contemplating the purchase of a marine engine for any service, be it a "dink" or a twin motored cruiser or houseboat, in fairness to yourself and your future satisfaction, investigate the Red Wing Thorobred line before you buy. It may mean the difference between the Failure and Success of your boat. A good motor means everything. Nor need you spend a fortune to have it.

Write us for information and prices on our five sizes, 10 to 40 H.P.; at least, INVESTIGATE! We gladly submit the Thorobred to any and all comparisons.

RED WING MOTOR CO.

Dept. B. RED WING, MINN., U.S.A.

Eastern Distributors: Verrier, Eddy Co., 222 E. 42nd St., New York, N. Y.; W. H. Moreton Corp., 780 Commonwealth Ave., Boston, Mass.; W. E. Gochenaur Mfg. Co., 631 Arch St., Philadelphia, Pa.; Hutchinson Bros., Alexandria Bay, N. Y.

Our exhibit will be in Block C New York National Motor Boat Show, February 17th to 25th

Advertising Index will be found on page 192

Just Out!

Write today for your copy of the newest Willis catalog of marine supplies. Mailed free upon receipt of your request by letter, card or phone

Except where specified we ship immediately from stock anything listed in this catalog.

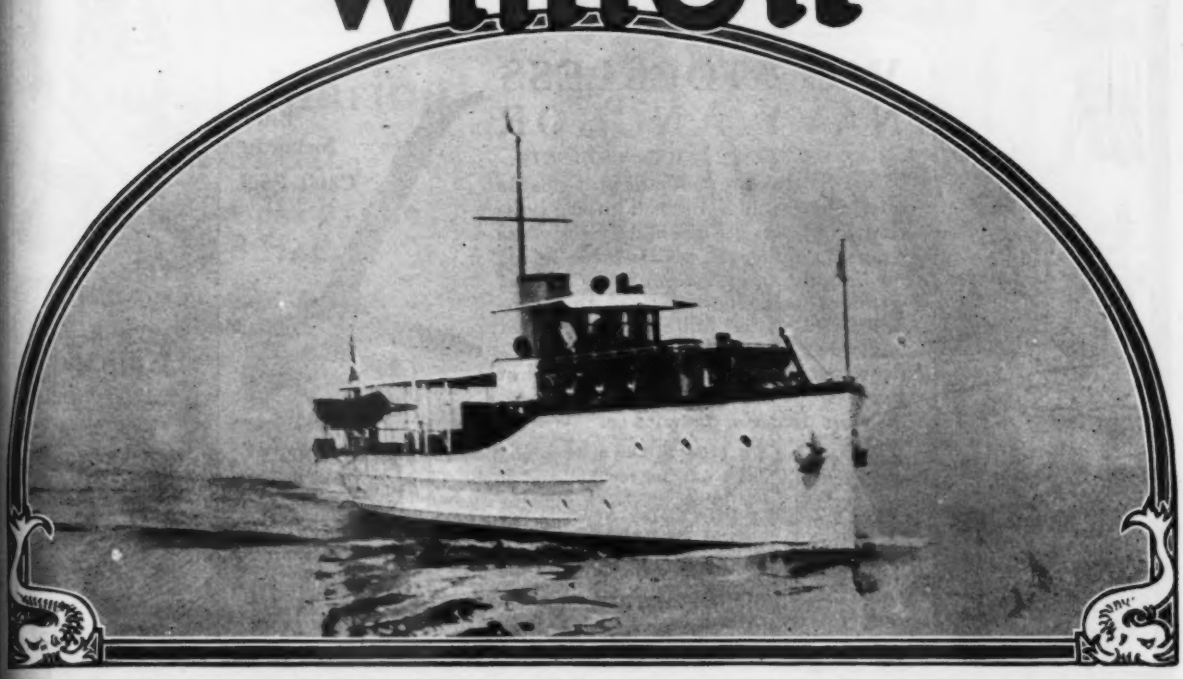
THIS catalog lists, illustrates and describes thousands of items of motor boat equipment, with new low Net Prices. It is interesting and invaluable to every boat owner, marine dealer and builder. You should have a late copy always at hand.

We are the largest mail order dealers and jobbers of motor boat supplies, accessories and marine hardware. We offer you the same low prices and prompt service by mail that you would get if you could call at our store.

Quantity purchases and long experience in this business enable us to quote you the lowest prices consistent with quality.

Write to 85 Chambers St., New York, or phone Worth 3624 for the catalog.

Winton



"Hopestill," Mr. C. W. Wiley's splendid yacht, the finest in appointment of any cruising yacht on the Pacific Coast. Main power plant consists of two 80 h.p. type W6 Winton Gasoline Marine Engines. Cruising speed 14 m.p.h. Auxiliary equipment includes 3 k.w. electric generating set driven by Winton gasoline engine.

DISCERNING yachtsmen can well study the record already made by the Winton Marine Gasoline Engines in the *"Hopestill."* These engines were the choice of an owner whose long experience in ship building and as a yachtsman inevitably led him to the Winton as correct power for his own yacht.

These engines were installed in Charleston, N. C., and the *Hopestill* immediately embarked upon the long voyage to Seattle. She made, according to the engineer's log, 6,700 miles on 6,300 gallons of gasoline. The run from Charleston to San Diego was made in 27 days, the engines performing perfectly. Through heavy weather and fair she kept to a steady schedule. From Balboa to Acapulco, 1,498 miles, the distance was covered in 7½ days without stopping the engines, and during the long 6,700-mile run the only stops made were upon signal from the pilot house.

With such a record on her trial run it is not strange that the owner feels, as do hundreds of Winton owners, that he has indeed found an ideal power plant.

WINTON ENGINE WORKS

CLEVELAND **OHIO, U. S. A.**

New York—A. G. Griese, Inc., 30 Church Street
San Francisco—F. G. Bryant, 593 Market Street
Seattle—H. W. Starret, Sunset Engine Company
Jacksonville, Fla.—D. J. Garrison & Company
Washington, D. C.—R. L. Fryer, 817 Albee Bldg.

© 1921, Rex W. Wadman, Inc.

WC STOCKLESS NAVY ANCHOR

ONE OF THE 1001 **WC** *PRODUCTS*

Takes hold at the first pull of the cable and hangs on like the well known bulldog. Tripping fin absolutely prevents dragging flukes up. One-piece head; no mud-gathering pockets. Solid wrought iron shank; free from "pinhole." Lies in holding position at angle of 55° to flukes, per Navy specifications. Heavily galvanized by hot process. Proper shackle furnished. At your dealer's, or write us.

Bites Instantly
Can't Foul

GET THIS BOOK of Helpful Hints for BOAT OWNERS

"Sea Craft Suggestions and Supplies" solves those daily "puzzlers" that few know how to handle. Tells how to Box the Compass; what is Proper Ground Tackle; gives hints on Steering Gear, etc.; describes WC Dependable Marine Hardware; tells uses. Compiled from 75 years' experience in making marine fittings. **50c** prepaid.

WILCOX, CRITTENDEN & CO., INC. (Est. 1847)
4 SOUTH MAIN STREET MIDDLETOWN, CONN.

Visit Space 108 at the New York Motor Boat Show

"The Capitol"

A Marine Unit Power Plant

For Speed Runabouts and High Class Cruisers

COMPLETELY ENCLOSED—COMPLETELY EQUIPPED

FROM the first glance the Capitol inspires the confidence of marine engine buyers. Its clean cut, well proportioned exterior with every moving part enclosed and every accessory built in immediately suggests the fact that it is the product of master designers. There isn't a smoother, quieter running marine engine. Vibration and noise are eliminated by perfect balance of moving parts, wide-faced helical-cut timing gears, force feed lubrication, ball bearing universal joint, three point suspension, and many other improvements over ordinary construction.

Dash instrument and switch plate controlling ignition, lights, ammeter, oil gauge and dash lights

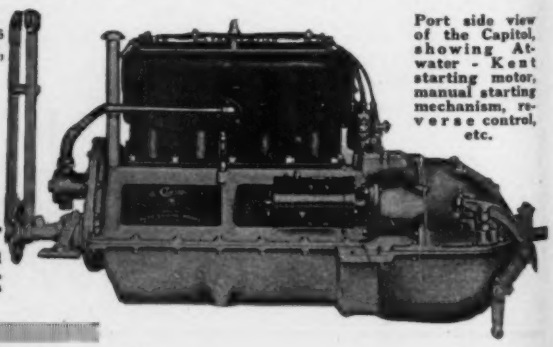
Highest Grade Equipment

Delco ignition, Atwater-Kent two-unit starting, lighting and generating system, Willard storage battery, Stromberg or Schebler carburetor, instrument plate shown above and all other necessary equipments are included.

If you own or are planning the kind of a runabout or cruiser that deserves a really excellent power plant, you should know more about the Capitol, its special features of construction and how it is built.

Bore 4¼" Stroke 5½"
High Speed Model 60-65 H. P. at 2000 R. P. M.
Medium Speed Model 30-34 H. P. at 1000 R. P. M.

Write today for complete description and prices



Port side view of the Capitol, showing Atwater - Kent starting motor, manual starting mechanism, reverse control, etc.

Auto Engine Works, St. Paul, Minn., U.S.A.

Eastern Representatives: Ventnor Boat Works, Atlantic City, N. J.; Fred C. Duclon, Alexandria Bay, Jefferson Co., N. Y.; Gray-Aldrich Company, Inc., 64 Atlantic Ave., Boston, Mass. Canada: The A. R. Williams Machinery Company, Limited, 64-66 Front St. W., Toronto, Ont.

Advertising Index will be found on page 192

Announcing
a new

Doman Marine Motor

4 cylinder 3⅛ by 4½
15-18 H. P.

Doman Engines Made in Sizes
4 to 50 H. P.

FIRST COST is not the proper basis for figuring Cost of Ownership

IT is not what you pay for a motor that measures your satisfaction in your purchase, but what you get.

The operation of purchasing is usually brief, often painless but whether it has been a wise purchase time alone can tell.

The Doman L.M-4 we believe possesses those qualities which reveal their value in ever increasing ratio as time goes on. We believe it to be the most economical engine to operate of any engine of its approximate size in the world. Back of our belief is the report of comparative tests made by the State University of Nebraska.

Economy of operation is a prime factor in Cost of Ownership.

The Doman L.M-4 is properly balanced in its reciprocating parts and is closely governed giving smoothness of operation that makes you happy to run it and adds to its longevity.

Another factor of importance in the final Cost of Ownership.

A careful comparison of the size of bearings, crankshaft and the high standard of ignition, carburetor and other accessories will quickly convince you that nothing has been overlooked that would increase your safety and final satisfaction of Ownership.

Satisfaction of Ownership is Proof of a Wise Purchase.

Doman Marine Engines have served well their owners for 28 years.

Write for complete descriptive folder.

Universal Products Co.

Doman Engine Division

Oshkosh, Wis.

DEALERS—Territory now being allotted

SETH THOMAS
MARINE CLOCKS

There Are None Better

Ship's Bell

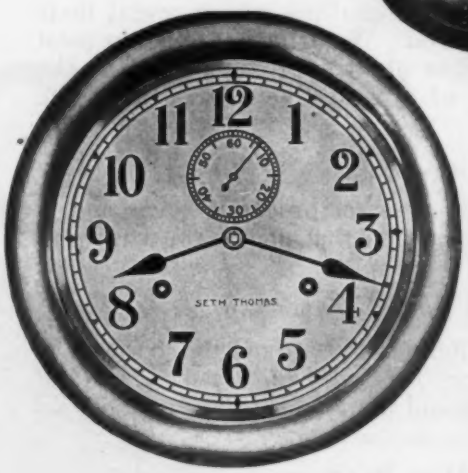
Metal Case, Polished Brass or Nickel-Plated. Six-inch Silvered Dial, Hinged Bezel.

Height 10½ inches

Striking "Eight Bells" same as they are rung on board ship. These are called one-day movements, but will run for about three days. Are strong and simple in construction and do not easily get out of order.

Wood Back. List Price, **$18.50**

Four-Jewel Movement and Metal Back Case. List Price, **$22.00**



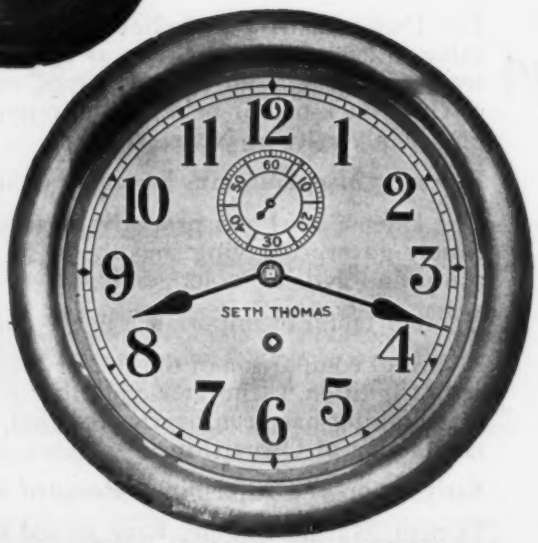
BOAT CLOCK

Striking "Eight Bells" as they are rung on board ship. One-day movement.

Heavy Gauge Spun Brass Case, Flange Front and Back, Hinge Bezel. Six-inch Silvered Dial. Brass or Nickel-Plated.

Width 7 inches

List Price, **$18.50**



HIGHEST GRADE METAL LEVERS

8 Day, 7-Jeweled movements of finest quality, in heavy cast brass cases, with silvered dials.

Used in large numbers by U. S. Navy and U. S. Shipping Board. Brass and Nickel-Plated.

No. 3, 3¾-inch dial, screw bezel case. List Price, $35.00.
No. 4, 4½-inch dial, screw bezel case. List Price, $40.00.
No. 6, 6 -inch dial, screw bezel case. List Price, $45.00.
No. 80, 8½-inch dial, hinge bezel case with padlock and key. List Price, $65.00

Suitable for Home, Clubs, Steamships, Boats of all kinds, for gifts, etc., etc. You can obtain of your Jeweler full information of our complete line of highest grade 8-day jeweled time and 8-day jeweled ship's striking clocks in various types of wood and metal cases, also of medium grade time and ship's strike clocks.

SETH THOMAS CLOCK CO.

Reliable Clock Manufacturers Since 1813

RK **CHICAGO** **SAN FRANCISCO**

Advertising Index will be found on page 192

Peerless

"The Engine that Makes Good"

HORATIO L. HALL
4032 MAGNOLIA AVENUE
CHICAGO

Feb. 23, 1921.

Peerless Marine Motor Co.,
2160 Niagara Street,
Buffalo, N.Y.

Gentlemen:

You will recall the two 25-35 H.P. Peerless Motors you furnished me five years ago.

These motors are running as nicely to-day as ever, and there has never been a broken part. They are the best motors ever made regardless of price.

Herewith enclosed are photos of my boat equipped with the engines as mentioned above. I get ten miles an hour at 600 revolutions. As you know the boat is 48' X 13' 2". The water, gasoline, ballast and supplies weigh approximately 10,000 lbs.

Yours truly,

H. L. Hall

Peerless Four-Cylinder 25-35 H. P.

After five years' service—
"They are the best motors ever made, regardless of price"

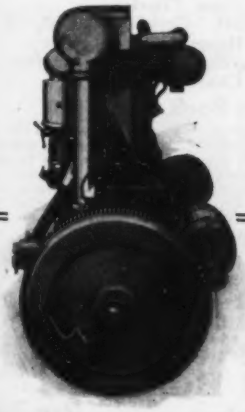
BRAND new owners are apt to be a bit enthusiastic about their motors and their boats. But when a man has shipped with the same motors five years, his opinion is a product of actual experience, a statement worth its face value. It takes a mighty good engine to please a man day after day for five years.

Peerless Marine Motors have a habit of making good and pleasing their owners. Not only that but they give the kind of service that makes boating a real pleasure or a profitable occupation, according to the type of boat you own.

These motors have proved it isn't necessary to pay a fancy price to get a satisfactory power plant. You may pay more or pay less, but you can't get greater value for your money.

The regular Peerless line includes motors from 5 to 50 H. P. built for medium and heavy duty, and suited to all types of boats. You will find them in classy speed runabouts, in big attractive cruisers and hard working fish boats.

Let us tell you the size, power, dimensions and price of the Peerless that is most suitable for your boat. If you are buying an engine this year you owe it to yourself to consider a Peerless.



Write today for latest catalog, giving dimensions and details of your boat.

Peerless Marine Motor Corporation

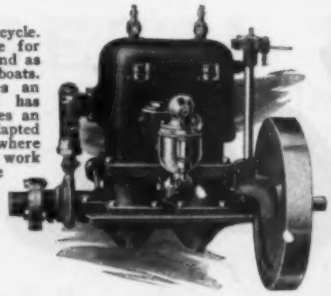
2160 Niagara Street **Buffalo, N. Y.**

The New High Speed Light Weight Peerless Motors

A year ago we added this high speed line, and it found instant favor with owners of fast boats. The lightest weight marine motors on the market, good for speeds of 25 to 45 miles per hour. Special castings and alloy steels give great strength with minimum weight. Speed 1650 R. P. M.

4 cyl. 125 H.P. Weight complete 700 lbs.
8 cyl. 250 H.P. V type. Weight complete 900 lbs.
12 cyl. 400 H.P. V type. Weight complete 1100 lbs.

Write for complete specifications and prices.



Model 68, 2-cylinder, 2-cycle. The 6 H.P. is suitable for boats of 15 to 24 feet, and as auxiliary power for sailboats. Delivers 6 to 11 miles an hour. In hydroplanes has done as high as 18 miles an hour. The 8 H.P. is adapted to the same purposes, where more speed or heavier work is required. In pleasure or work boats of from 20 to 30 feet length, it will deliver from 8 to 15 miles an hour.

For the Small Power Boat —the L-A 2-Cycle Engines

EVERY essential for ideal small boat power is embodied in Lockwood-Ash two-cycle engines—Models 24 and 68.

The principle of the two-cycle engine, as developed by Lockwood-Ash in these models, makes possible abundant power with only three interior moving parts—the piston, connecting rod and crankshaft — under strain. Such parts as valve tappets, cams and crankshafts, gears and chains, with their attendant difficulties, are entirely eliminated.

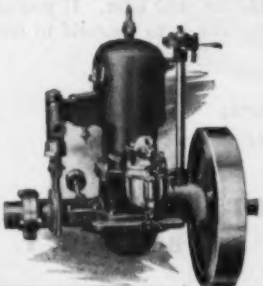
The simplicity of these L-A models—the fewer number of parts used in their construction — means lighter weight and better balance, lower first cost and lower upkeep. It allows the use of a very simple lubricating system—mixing the oil with gasoline. It means long, uninterrupted service—the elimination of petty engine troubles—freedom from breakdowns with their resulting loss of time.

L-A two-cycle engines may be reversed or run in either direction without the necessity of reverse gears. Reverse may be obtained by starting the engine in the direction it is desired to be run—or by reversing upon its own power.

Absence of complication—freedom from strain upon moving parts—makes for more even power distribution. A steady flow of dependable power is provided under all conditions—twice the ordinary number of power strokes are delivered at every revolution of the flywheel.

Valves are so constructed that they are not subject to heat—never require grinding or readjustment—are not subject to carbon adhesion.

To the expert engine man and to the amateur alike, L-A Models 24 and 68 commend themselves for their simplicity, their light weight, their easy starting and their absolute reliability in operation.



Model 24, 1-cylinder, 2-cycle. The 2½ H.P. for boats 14 to 18 feet long, delivers 6 to 8 miles an hour. The 4 H.P. for 16 to 20 foot boats, from 6 to 9 miles an hour.

Prices range from $78.89 to $144.08. Write for complete description and specifications. Convince yourself that L-A two-cycle engines are suited to every need for ideal small boat power.

Lockwood-Ash Motor Co.
2207 JACKSON STREET
JACKSON, MICH.

LOCKWOOD-ASH
MARINE LA ENGINES

Motor Boatmen's Charts and Log Sheets

Published by MoToR BoatinG
119 West 40th St., New York

Charts printed on heavy cardboard 8½" x 11" and punched to fit standard loose leaf folder.

Contain name and location of all principal ports and harbors, distances, compass courses and sailing directions. Invaluable for use on small boats and motor yachts. The set now includes the following charts:

Series A

No. 1—Western End of Long Island Sound.
No. 2—Eastern End of Long Island Sound.
No. 3—Block Island Sound.
No. 4—New York Harbor.
No. 5—Boston Harbor.
No. 6—Buzzards Bay.
No. 7—Block Island to Vineyard Sound, including Narragansett Bay.
No. 8—Delaware Bay.
No. 9—Chesapeake Bay, Part 1, Upper Part.
No. 10—Coast of Maine, Portland to Rockland.
No. 11—Hudson River, Kingston to Albany.
No. 12—Chesapeake Bay, Part II, Central Part.

Series B

No. 13—Lake Erie—Eastern Part.
No. 14—Lake Erie—Western Part.
No. 15—Hudson River, New York to Kingston.
No. 16—Lake Champlain.
No. 17—Erie Barge Canal.
No. 18—Massachusetts Coast.
No. 19—New England—Newburyport to Portland.
No. 20—Cape Cod Bay.
No. 21—Maine, Monhegan to Eastport.
No. 22—Chesapeake Bay, Part III, Lower Part.
No. 23—Biscayne Bay.
No. 24—St. Lawrence River and Thousand Islands.

Motor Boating's New Charts—Series C

The third series of MoToR BoatinG's popular charts begins with No. 25, which covers the Delaware River from Trenton to Philadelphia. Others in this series which follow will complete the route to the sea via the Delaware River as well as cover many interesting stretches of cruising waters on the way south and along the coast. It is planned to issue these about as listed below:

No. 25 Nov., 1921..Delaware River, Trenton to Philadelphia.
No. 26 Dec., 1921..Delaware River, Philadelphia to Smyrna.
No. 27 Jan., 1922..New Jersey Coast, Cape May to Little Egg Inlet.
No. 28 Feb., 1922..New Jersey Coast, Little Egg to Barnegat Inlet.
No. 29 March, 1922.New Jersey Coast, Barnegat Inlet to Sandy Hook.
No. 30 April, 1922.Chesapeake Bay, Smith Point to Cape Charles.
No. 31 May, 1922..Potomac River to Lower Cedar Point.
No. 32 June, 1922..York and James Rivers.
No. 33 July, 1922..Delaware Coast, Cape Henlopen to Chincoteague Inlet.
No. 34 Aug., 1922..Virginia Coast, Chincoteague to Cape Charles.
No. 35 Sept., 1922..North Carolina Coast, Cape Henry to Beaufort.
No. 36 Oct., 1922..Carolina Coast, Beaufort to Charleston.

Log Book

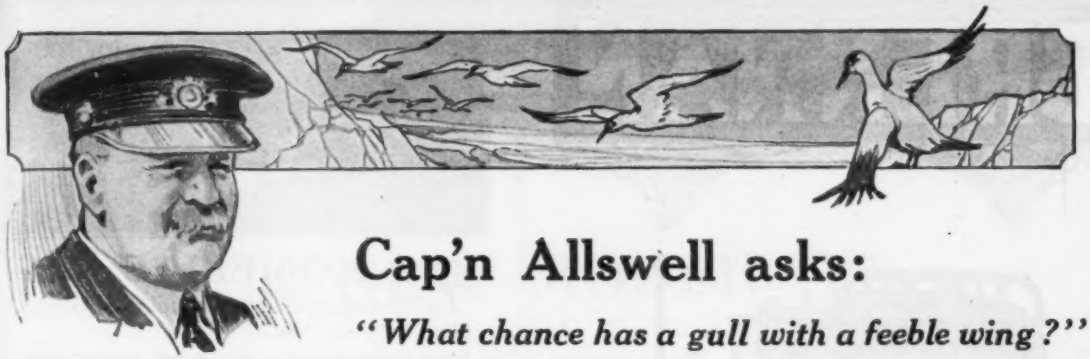
MoToR BoatinG has also published a log sheet to fit the standard 8½" x 11" loose leaf folder. Each sheet contains spaces for such data as time of passing various aids to navigation, names of aids, magnetic and compass courses, distances, patent log readings, speed of boat, revolutions of motor, wind direction and force, condition of weather and sea, depths of water, fuel, time of high and low water, etc., etc.

Prices

Charts 25 cents each or $1.50 per set of 12, 36 Charts for $3.50 (Series C will be sent as published). Log Sheets $1.00 per set of 50 Sheets.
Loose Leaf Binders (canvas bound) to hold charts and log sheets, $1.75.
36 Charts, 50 Log Sheets and Loose Leaf Binder to hold Charts and Log Sheets, $5.00.

MoToR BoatinG
119 West 40th Street, New York

Advertising Index will be found on page 192

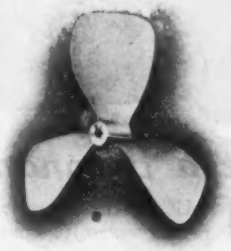


Cap'n Allswell asks:

"What chance has a gull with a feeble wing?"

BY the same token, what chance has a boat with a weak propeller? Like's not she'll fail you just when you'd give your ol' eye teeth to keep up with the procession!
Give *me* a bronze wheel every time. Bronze's tough, strong and workable. You can bring the blades down thin and sharp at the tips—for speed and power—and still keep plenty of body in the shank.

If you hit a rock with a cheap, brittle wheel, the blade'll likely snap off at the hub leaving you much out of luck in the buzum of the deep! With a bronze wheel, you may get a bent tip. That's easy to fix and you're not hung up in distress. It's the truth: all's well when you've a Columbian wheel.



Why not get the facts in full? Send for Columbian Book No. 5

THE COLUMBIAN BRONZE CORPORATION, 522 FIFTH AVENUE, NEW YORK CITY
New York Sales Only: 44 Third Avenue.

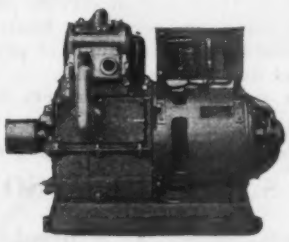
COLUMBIAN *Bronze* PROPELLERS

Block "L" Main Floor, Motor Boat Show.

Plenty of Light with Plenty of Room

THIS unique plant is only 33" long, 22" wide and 23" high. It leaves plenty of room in yacht or cruiser, but generates 1500 watts —all you need for the interior, the searchlight and for the wireless. The power is supplied by a 5 H.P. engine direct-connected to the generator. Not only is it a sturdy, compact plant, but the

Engine Uses Kerosene or Gasoline And Its Parts Interchange With Ford Parts



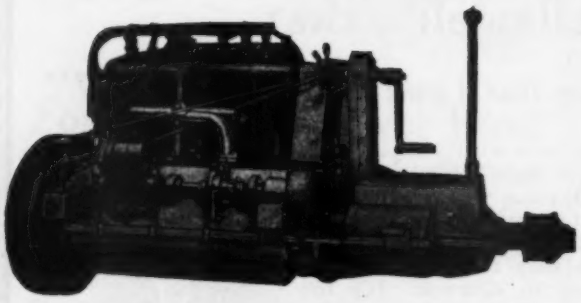
33 inches long

Send for Folder No. 5

INSTALL THE
COLUMBIAN
C-Y-C
Electric Lighting System

Columbian Bronze Corporation
522 Fifth Ave., New York City
Block "L" Main Floor, N. Y. Motor Boat Show

BRENNAN MOTORS



Put a Brennan In Your Boat

THE practical service value of your boat depends entirely upon the reliability of the engine you install. But reliability isn't entirely a matter of the price you pay. Reliability is the product of good design, plus good materials, plus experience and honesty in manufacture.

Put a Brennan motor in your boat if you want the utmost service and reliability at the lowest cost consistent with good materials and honest quality.

Brennan Motors give smooth, economical and constant service. Reliability is built into them through the perfection of each part,—through high grade materials, carefully machined and assembled,—through proper design in the first place, and proper testing as the last step before they leave the factory. It isn't necessary to pay an exorbitant price for reliability if you choose a Brennan.

Brennan Motors are manufactured in several sizes which are adapted to many different types of boats. In the Model B illustrated above, four cylinder 4½" x 5", the reverse gear, clutch and rear starter are all built in as an integral part of the design. This makes a neat compact engine that looks good and is good.

Prices Reduced By 20%

You don't have to pay peak prices if you pick a Brennan for 1922. In recently reducing our prices by 20% on all Brennan motors we not only gave our prospective customers the advantage of all present reductions in manufacturing cost and materials but we actually anticipated possible further savings which we hope to effect through increased demand and larger production. Present prices are not guaranteed against increase.

Write today for illustrated catalog and prices. Tell us about your boat if you want our recommendations as to the proper engine equipment.

Brennan Motor Manufacturing Co.

SYRACUSE, *Cable Address* **N. Y., U. S. A.**
500 East Water St. *"BINOT"*

HOMELITE

THE ideal electric light and auxiliary power plant for your boat.

Stow in corner of engine room, under sink or galley stove—ready for instant use on touch of a button.

Economical—gallon of fuel furnishing 2000 Watt Hour.

Lights boat, charges batteries, runs bilge or fire pump—heats toaster, percolator, etc. 12 or 32 Volt.

Made by

THE SIMMS MAGNETO COMPANY
EAST ORANGE, NEW JERSEY

Eastern Marine Distributors

Smith-Meeker Engineering Co.

123 Liberty Street
New York, N. Y.

Write for Booklet and Prices

Ritchie for Reliability

THE safety of your boat and often your own life depends upon the accuracy and reliability of your compass.

Ritchie Liquid Compasses have been the best on the market for over seventy years. The reputation of our product, the experience of our workmen, the facilities of our factory, the traditions of our business all insure the same high quality in every compass we produce.

Ritchie Compasses have been used exclusively in the U. S. Navy for more than 40 years. More than 60,000 of them are in service on merchant ships. Our compasses for motor boats and motor yachts are the same instruments of precision that you will find in the big ship sizes.

The best marine supply dealers sell Ritchie Compasses.

Write today for catalog and prices.

E. S. RITCHIE & SONS
ESTABLISHED 1850

110 Cypress Street Brookline, Mass.

Liquid Compasses Underlighted Compasses
Binnacles, etc.

Advertising Index will be found on page 192

The NEW MODEL "T"

FRISBIE VALVE-IN-HEAD MOTORS

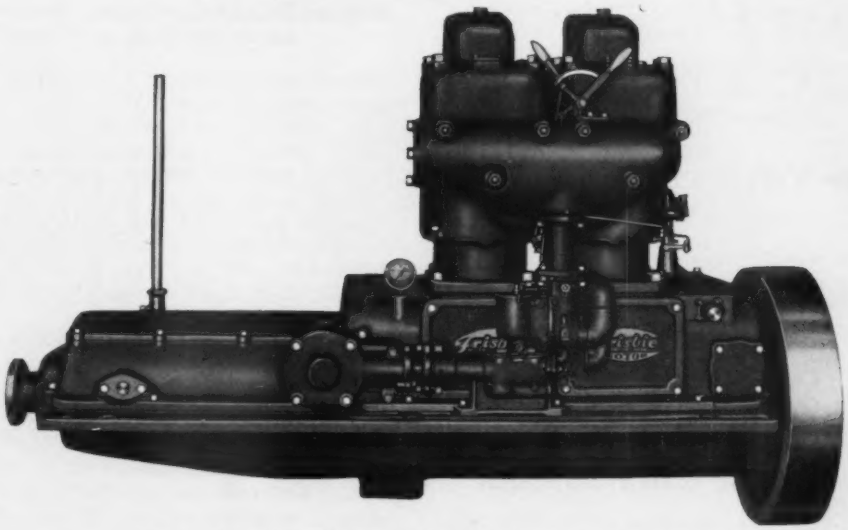
Heavy Duty, Medium Speed

T2, 2 cyl., 20 H.P., 600 R.P.M.; Weight, 1300 lbs.
T4, 4 cyl., 50 H.P., 600 R.P.M.; Weight, 2150 lbs.

High Duty, Medium Speed

T4 Special, 4 cyl., 100 H.P., 1200 R.P.M.; Weight, 2000 lbs.

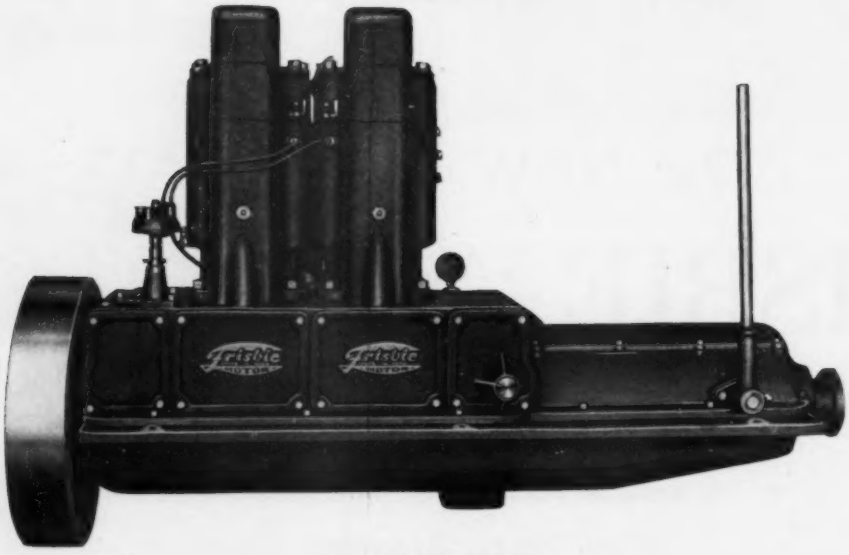
Dual Valve
All Inclosed
Hot Spot Manifold
Removable Heads



Model T2, 20 H.P., 2 Cyl., 6" Bore, 6" Stroke, 600 R.P.M.
(Manifold Side)

Frisbie an' I

Frisbie VALVE-IN-HEAD MOTOR



T2, 20 H.P. Port Side

The NEW MODEL "T"

THE T2 and T4 in this new model offer to users of heavy boats of moderate size, commercial fishermen and sailors seeking auxiliary power, an installation of refinement, cleanliness, quietness, and reliability not heretofore available for that class of work. The T4 Special provides a reliable, cleanly, all-day high duty motor for the popular Express Cruiser.

All moving parts (except the flywheel in the T2, 2 cylinder) are entirely inclosed, yet easily accessible for inspection, adjustment or replacement.

Four Valves to the Cylinder

Unusual Efficiency

Thorough scavenging. Small, noiseless, trouble-free valves actuated by one push rod and one synchronized rocker arm with self-lubricating bushings for each pair of exhaust and intake valves. This simple mechanism together with the "hot spot" manifold and other features of the Model "T" design insures unusually economical operation with the present grade commercial fuels.

Cylinders of Extra Strength

Cylinders are cast separately with uniformly heavy walls, fitted firmly into the base and held by oversize studs. The entire combustion chamber is machined, leaving no projections for carbon deposit.

Heads Are Detachable

Without Disturbing Gaskets, Intake or Exhaust Manifolds or Wiring

This unusual accessibility is obtained by carrying the gas passages within the cylinder casting to a point below the line of the head which also provides a "hot spot" intake manifold, as the incoming gases come into contact with the hot exposed portions of the exhaust line and are perfectly dried and vaporized. Jack screws are located in the head to facilitate removal without damage to the gasket. All studs are threaded and run through bosses in the castings, thus avoiding any contact with the circulating water.

Absolutely Self-Lubricating

No outside oiling whatever is necessary. Lubrication is by pressure feed through steel tubes cast in the crankcase and the oil is supplied by a gear pump installed below the level of the oil, where it is always primed and practically free from wear. There is a by-pass by which the oil

Frisbie an' I

Advertising Index will be found on page 192

Frisbie VALVE-IN-HEAD MOTOR

pressure to all main bearings can be regulated and through which oil is passed over all gears before being strained and again returned to the pump.

Crank Shaft

Crank Shafts are two and one quarter inch nickel steel with a large bearing provided for every throw. The reverse gear is set between flanged couplings and is readily removable, although completely inclosed.

The bearings are all replaceable and adjustable and are hung in the upper half of the crank case in accordance with modern practice. This includes camshaft bearings, which are on plates set into the side of the base, allowing the removal of the entire camshaft without disturbing any other part of the motor.

Water Circulating Pump

On the 2 cylinder medium duty motor the water pump is of the bronze plunger type, driven at camshaft speed, while on the T4 and T4 Special it is of the gear type for quiet and efficient operation at higher speeds.

Carburetion

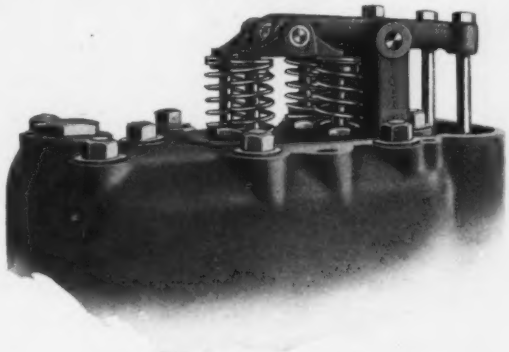
Warm air for the carburetor is taken both direct through an exhaust stove and through rocker arm and push rod inclosures to and through the base, thus ventilating the valve operating mechanism and carrying any smoke out through the exhaust.

Efficiency

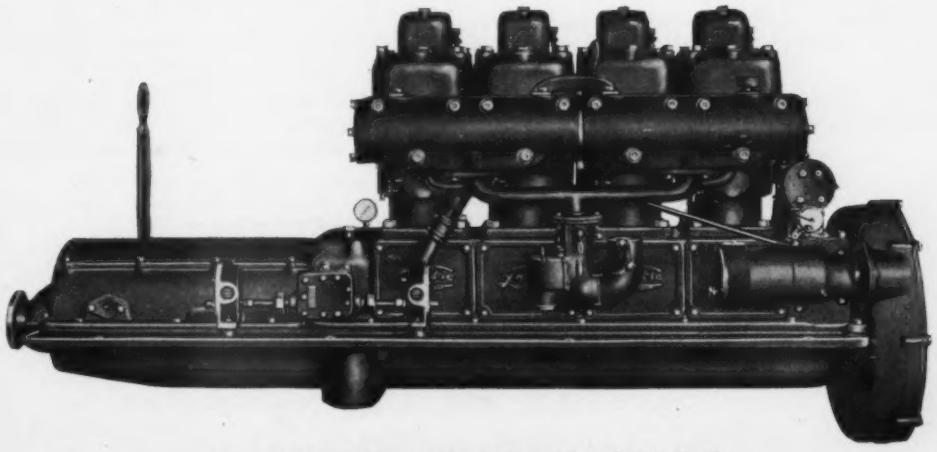
Dynamometer tests in which this motor developed nearly 20% above our conservative power rating, supplemented by exhaustive tests in boats, show an average fuel consumption of .58 pounds horse power per hour; and Model "T" engines in continuous operation under service conditions have proved as far superior as were the other models of the "Friendly" Frisbie Family when designed and placed on the market some twenty years ago.

Equipment

Equipment consists of engine, reverse gear, spark plugs, water circulating pump, priming cups, car-



Showing cylinder head of Model "T"



Showing manifold side T4, 4 Cyl., 50 and 100 H. P.

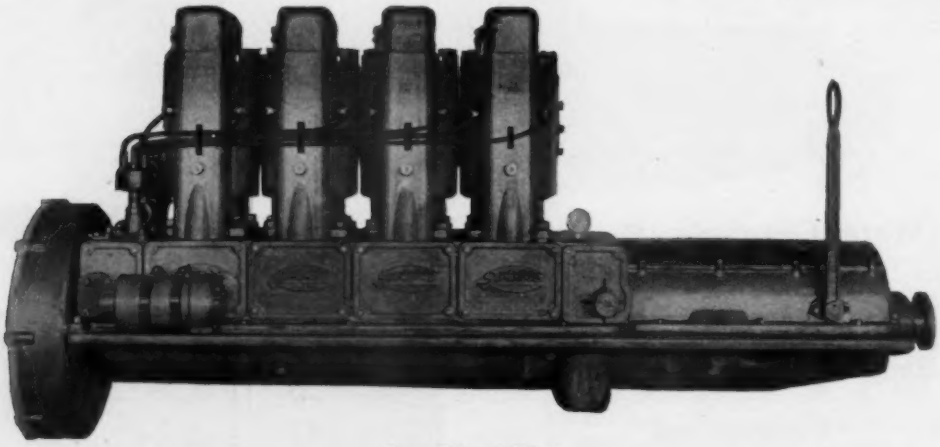
Frisbie an' I

Frisbie VALVE-IN-HEAD MOTOR

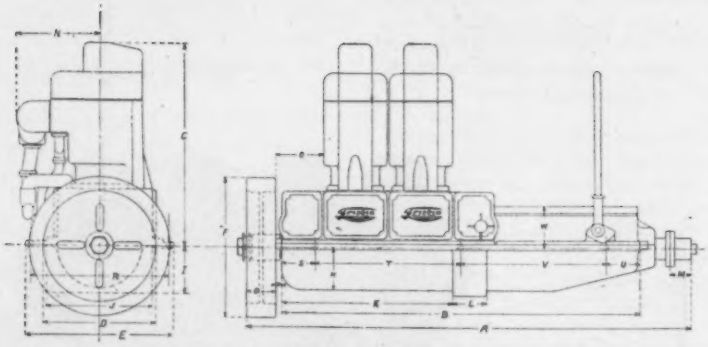
buretor, oil gauge, switch, ball thrust bearings, mounted control levers and standard ignition. Electric starting and lighting and double ignition equipment is furnished as an extra on Model T2, which this motor is designed to accommodate as a complete power unit. This equipment is standard on models T4 and T4 Special. All accessories used are standard and parts can be obtained at any service station of the manufacturer involved.

Guarantee

Every engine is absolutely guaranteed against defects in material or workmanship for a period of one year from date of shipment, and any parts found defective will be repaired or replaced free of charge if returned to the factory for inspection, transportation charges prepaid. This guarantee does not apply to cases of carelessness or abuse, or to work done outside our factory.



Port Side of T4



KEY TO DIMENSION CHART

	A	B	C	D	E	F	G	H	I	J	K
2-Cyl.	62¾"	50⅝"	28⅞"	16"	21"	20"	4"	6"	6¾"	15"	24¼"
4-Cyl.	85½"	72⅞"	28⅞"	19"	24"	20"	4"	6¾"	6¾"	15"	43¾"

	L	M	N	O	P	R	S	T	U	V	W
2-Cyl.	4¾"	3"	12"	6¾"	¾"	19½"	4 13/16"	19⅞"	2 5/16"	23⅝"	6"
							Lag Bolt Centers				
4-Cyl.	4¾"	3"	12"	6¾"	¾"	22½"	4 13/16"	20½"	6 9/16"	20½"	7⅜"

The Frisbie Motor Co., 7 College St., Middletown, Conn.

Frisbie an' I

Advertising Index will be found on page 192

Fifth Avenue isn't Venice
—BUT A WATERFORD—

will carry you and your family on *your* "Fifth Ave."—on river, lake, or ocean with economy and with absolute safety. A Waterford is always ready to deliver dependable water transportation as you want it. Your summer home or camp is incomplete without a Waterford. It is a luxurious necessity. Treat your guests to a water ride in a Waterford.

Fishermen and hunters are buying the Waterford because of its Maxim-silenced motor and because it gets them into the shallow places—bays and headwaters—without oar work.

A Waterford goes over sunken logs, rocks, submerged objects automatically without injury to its propeller. Travels anywhere from a trolling speed to 12 miles per hour.

Waterfords are built in three models—Scout, Utility and DeLuxe. They are delivered complete, ready to put in the water and run. Standardization in manufacture coupled with volume production puts the prices at $375, $425 and $475.

Write for illustrated catalog. It answers every question, shows the Waterfords in natural color, is full of information, and tells you how you can enjoy the real pleasures of water transportation economically.

Over 4000 in use on the waterways of U. S. & Canada

DISAPPEARING PROPELLER BOAT CORPORATION - 725 Main St., Buffalo, N. Y.

Factories at North Tonawanda, N. Y., Wisconsin Rapids, Wis., Seattle, Wash., and Port Carling, Ont.

Sporting Goods Dealers Should Wire for Agency Proposition.

DOES YOUR

We Recommend Jeffery's

No. 1 Extra Quality Marine Yacht Glue for paying deck and hull seams; No. 7 Soft Quality Marine Glue for waterproofing cotton and canvas for covering decks and cabin tops, also for covering hulls of row-boats, motorboats and yachts.

Advertising Index will be found on page 192

BOAT LEAK?

Send for our Booklets

"How To Make Your Boat Leakproof" and "Marine Glue—What To Use and How To Use It."

Any old boat, so long as the frames are in fair condition, can be made water-tight by following the instructions in the above booklets. This applies to anything that floats, from a canoe to a yacht. Wood or steel. Put your leak troubles up to us; and we will help you to stop them.

Insist on having Jeffery's Marine Glue. For more than 75 years it has been the choice of the foremost boat builders of the world.

Jeffery's is a product that has not varied from the strict line of quality—it is not a competitive commodity made to meet a price.

JEFFERY'S WATERPROOF MARINE GLUE

We carry a large stock of all various grades. Each grade is for a different purpose. It is important that you use the grade *we recommend*.

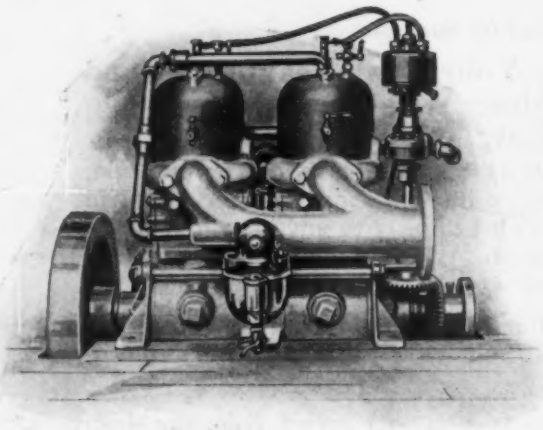
For sale by all Yacht, Boat and Canoe Supply Houses, Hardware, Paint and Oil and Sporting Goods Dealers.

L. W. Ferdinand & Company

152 Kneeland St.

Boston 11 **Mass.**

Fit For The Finest Boat Afloat!



Model B—10-16 H.P.

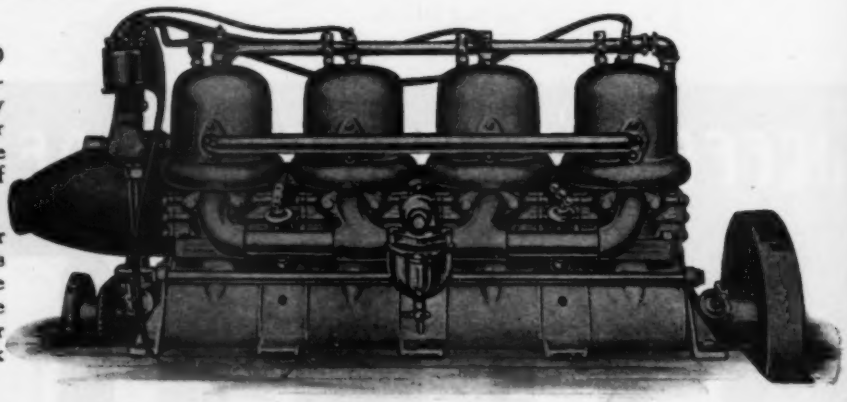
"HARVEY" motors are strictly high grade Marine Motors. Combine the reliability of Four-cycle motors and the simplicity and economy of the Two-cycle motors and your answer is HARVEY MOTORS.

For the small open Launch, Run-abouts, Speed Boats, Workboats or Cabin Cruisers.

Light in weight, with STRENGTH where STRENGTH is necessary.

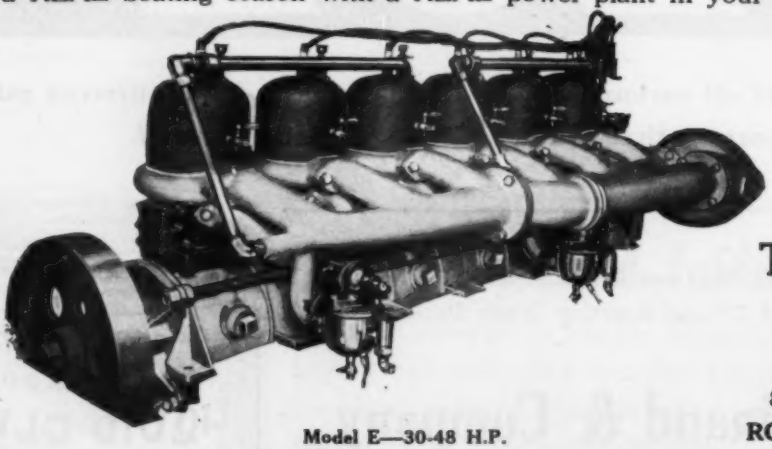
There are NO VALVES in these motors. It is not necessary to have them as our design gives you more power, and the cost of operation is smaller.

Why buy a motor that has valves if it is not necessary to have them, and at the same time gain more power without them? Think it over.



Model D—20-32 H.P.

Only a few more weeks until Spring. Place your order NOW and be ready to enjoy a REAL boating season with a REAL power plant in your boat.



Model E—30-48 H.P.

Made in five models
One to Six Cylinders
5 to 48 H.P.

Write for catalog.

THE HARVEY MARINE MOTOR CO.

82 HARVARD STREET
ROCHESTER, N. Y., U. S. A.

Note—Special Prices for the Motor Boat Show.

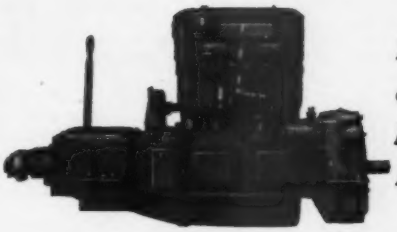
In order to further introduce our motors, we are offering a big reduction on all motors sold during the period of February 15th-28th (inclusive).

Formerly Known as the Celebrated Leary Motors.

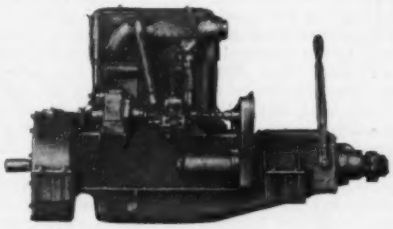
Advertising Index will be found on page 192

Knox
VALVE IN HEAD

"STEADY SERVICE"



From Every Side— a Masterpiece of Marine Motor Engineering



1921 Was A Good Season For the KNOX "20"

DURING the past boating season KNOX "20" has had plenty of opportunity to show its ability. In fast runabouts, in cruisers, in every type of boat up to a 64-foot auxiliary, these motors have been installed with great satisfaction to their owners, and with frequent surprise to observers who did not realize what twenty real dynamometer horsepower means.

We made the first public showing of the Knox "20" at the last Motor Boat Show. It was a brand new motor, just put into production. Unusual quality in design and construction was evident to experienced motor owners. But it still awaited the test of general service.

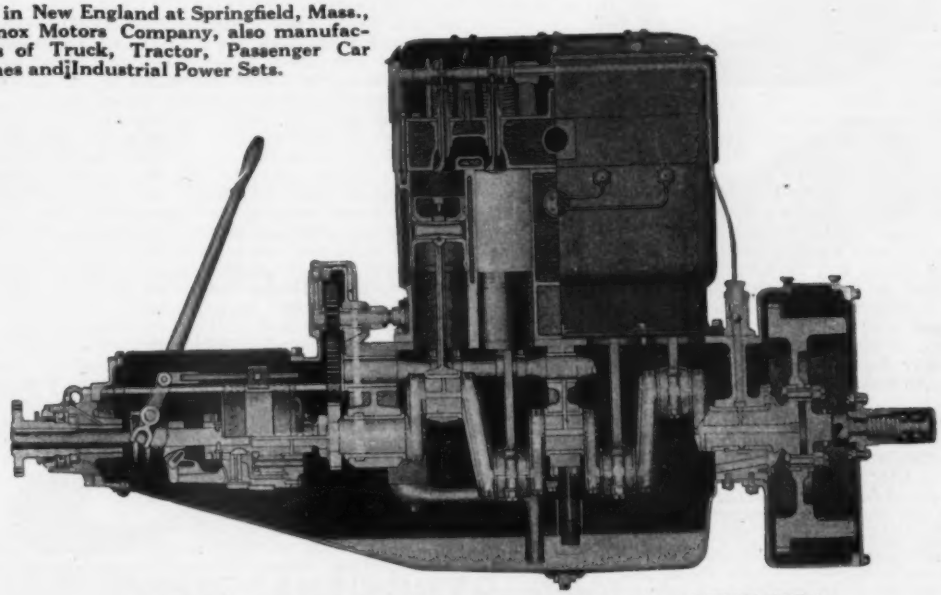
Now the KNOX "20" is a tried and proven product, not merely in factory tests under ideal engineering conditions but in daily use in the hands of actual boat owners. It has demonstrated in other boats just what it would do in your boat. It has demonstrated that quality counts, and that advanced engineering has produced a better marine motor than could have been designed with the degree of engineering knowledge of only a few years back.

Buy an up-to-date motor,—the KNOX "20". Write for catalog.

KNOX MOTORS ASSOCIATES

SPRINGFIELD, MASS., U. S. A.

Made in New England at Springfield, Mass., by Knox Motors Company, also manufacturers of Truck, Tractor, Passenger Car Engines and Industrial Power Sets.



You can trace the remarkable internal pressure oiling system of KNOX "20" in this drawing. But come to the Boat Show and let us show you on the engine itself.

Motor Boating

The Journey's End

(*Continued from page* 16)

the heavy weight of gasoline drums, and the sharp edges of acetylene bottles have pressed against it—and he successfully defied me to find a dent in its surface. If Hippocampus had been provided with a rub-streak of teak before passing through the Gatun locks she would not now require the services of a carpenter on her port side.

That evening we motored with a party of friends back to Colon for a go at the movies, and that night for the first time since our departure from Key West we fought a battle with the mosquitoes. In the terminal cities, and elsewhere in the Zone at a distance of more than 200 yards from the lake shore line, mosquitoes are practically non-existent, but at the light-house dock they are wild and wicked and voracious. Our old friend Citronella ministered to us through the night, but I suspect the Gatun mosquitoes of drinking from the mouth of the bottle and returning refreshed to the onslaught.

Consequently we were cheerless and heavy-eyed when our friends Arnold and Stevenson descended from the morning train from Colon and boarded us for the run across the canal. It was raining dismally at the time (as Davidson, who had slept on deck under the awning could well attest) and as we looked out over the broad reach of the lake we could see nothing. But the tropical clouds were incapable of spreading a wet blanket over the spirits of our new guests. They know the rainy season, and they confidently predicted that with the starting of the motor the rain would slack off and stay slacked off for the rest of the day.

As a matter of fact it did, and although the day was overcast, we were informed that we could have no more perfect weather for the Isthmian jaunt. The clouds, spreading a canopy under the sun, kept from us the infernal heat that is still remembered with dread by the men who dug Culebra Cut.

In itself our trip across the Isthmus was uninteresting, for the canal is so perfectly buoyed that a blind coal passer could not lose his way. But the proximity of the jungle and the anachronism of ocean-going ships meeting and passing in fresh water served as fuel for conversation. At Darien, where there is a powerful Naval radio station, we looked eagerly for the peak upon which our old friend Balboa stood when he sighted the Pacific—a peak immortalized in the lines of Keats:

"Or like stout Cortez when with eagle eyes
He stared at the Pacific—and all his men
Looked at each other with a wild surmise—
Silent, upon a peak in Darien?"

It's all the poetry I know, and Bartlett had to help me with the first three lines, but I had the satisfaction of declaiming it when under Steve's expert ciceronage, we found the peak—a green, close-cropped by the canal engineers, and seemingly no higher than a dozen hillocks surrounding it. Subsequently we learned that the peak where Balboa (or, if you take the poet's word for it, Cortez) stood and stared is situated in another Darien several counties nearer the Equator. But we had the thrill.

We had a very good time altogether. Someone cooked up a Navy mulligan at the psychological moment and we partook of its deliciousness as we passed between the still slipping sides of Culebra Cut—now known on the charts, but nowhere else, as Gaillard Cut. As we came to the locks of Pedro Miguel (invariably called Peter Mike) we licked from our fingers the last vestiges of the chocolate cake which Mrs. Arnold had contributed to cap our meal.

So fortified we were ready for anything—but found instead that peace and hospitality were to attend the last few miles of our southward voyage. At the Peter Mike locks we were informed that a welcome and safe mooring awaited us at the anchorage of the Balboa Boat House, and farther on at Miraflores a military-looking individual in the uniform of the lock guards cupped his hands and bellowed,

"Have you got your orders?"

"What orders, sir?" we asked, habit slipping a mental cog back to sub-chaser days.

"Your orders to make yourselves at home at the Balboa Boat House."

Having been subconsciously prepared for the command. "When gassed and provisioned you may put to sea," our relief was intense, and gratitude rendered us inarticulate.

A few minutes later we dropped quietly to sea level, and when the last gates opened found ourselves at last in the waters of the Pacific. There was room at this juncture for reminiscence of the hundreds and thousands of crooked miles that we had put behind us in linking Balboa with New York—but there was no time for reflection. As we swept out with the falling tide a small boat intercepted us and we were boarded by a man who we thought and feared was a pilot. If he was a pilot—and the insignia on his cap seemed to proclaim him such—he was spoiling our record in the last two miles of the journey. If he was not a pilot, he was as welcome as flowers in May.

Our anxiety was not relieved until after we had anchored at his direction and he had left us to our own devices. Then Red Gibson, the Balboa jack-of-all-trades, Whaler, Lear, Potter, and other yacht club members boarded us and we were informed that, anchored where we were, we would go high and dry at low water. So we knew that we had come to the southern point of our voyage without accepting the services of a pilot. Our escutcheon was still clean.

Getting under way again we secured our anchor on deck, and made fast to a club mooring, thereby paving the way for our last misadventure. For the next thirty or forty minutes there was a mad flourish of clothes below decks, from which emerged the crew of Hippocampus, slightly immaculate in liberty whites and with appetites whetted for a meal at the Century Club in Panama City. Lear had extended the invitation to crew and supernumeraries, but of the latter Stevenson and Arnold had other engagements, and only Davidson accepted. Carr, another club member, came alongside in a floating tin Lizzie which is the admiration and wonder of all inhabitants of the Gold Coast, and we were ferried ashore.

Of the dinner at the Century Club, graciously presided over by Lear's pal, his 14-year-old daughter Dora, of the ensuing drive through the cool of the evening along the smooth Pacific highways of the Zone, of our next day's visit to the ruins of Old Panama City, as guests of Davidson; and of other hospitality and diversions, there is room for no more than the merest mention. The arrival of Hippocampus at Balboa had been expected since June, and in August we were made to understand that our welcome had been elastically extended.

With the focus of our interest directed ashore poor little Hippocampus suffered a severe dislocation. Neglect put her nose out of joint, and when on the day after our arrival, the evening tide swept seaward in its sixteen-foot fall, she determined to create a diversion on her own account. Deftly, quietly, but with a grieving heart she dragged her club mooring to a high spot on the middle ground which parallels the water front, and there immolated herself on a sandy altar. At midnight when we left the shore in the club tender, caroling softly as voyageurs are wont to do in the sma' hours, Al Chambers' keen eyes were suddenly attracted by the silhouette of tilted spars against the skyline.

" Hello," he said, "Some poor dub is high and dry."

A tightening of the throat strangled my feeble effort to sing the bass of "Merrily We Roll Along," and I whispered,

"A thousand dollars (which I haven't) to one (which I hope to have) that I'm the dub."

Sure enough I was. As we drew nearer, we saw Hippo lying over on her side, in the pathetic attitude of one who, having struggled to do her best, has wearied of well doing. Around her there was enough water to float the club tender, and from it I stepped to the diagonal plane of Hippocampus' deck.

Below there was much confusion. Clothes, camera, typewriter, and cushions lay in a conglomerate heap on the cabin deck, a heap surmounted by my precious sextant. On nine hundred and ninety-nine other occasions I had wedged the sextant in its rack secure against Hippo's most erratic gyrations. On the thousandth I had neglected it. Even the chronometer, my most cherished instrument, hung precariously, fixed by two threads of one screw, for I had been in the act of dismounting it for packing when interrupted by some other duty.

But the good luck which has attended us in all our mishaps saved our possessions from major injury, and I derived much consolation from the fact that we were heeled over to port where my spare clothes were not. Chambers, whose neglected turn it had been to pump the bilge, also came out unscathed, but Squibb's locker received the bilge water.

Seeing that we could neither sleep nor mend matters until the tide had again risen, we returned with blankets to the yacht club and turned in on the porch deck. At three o'clock I was again aboard to watch Hippo come to an even keel, and to learn that she had done herself no harm in her adventure. The others joined me and we slept until mid morning, when we cast off our mooring and anchored in deep water.

So the cruise of the Hippocampus ended as it had begun and as it had been continued for four months, a chapter of hair-breadth escapes from amusing or frightening misfortune. On a dozen occasions if we had been a little more favored by Fate there would have been no story to write, and contra, if we had been less favored there would have been no one left to write the story. Success has crowned our efforts.

* * *

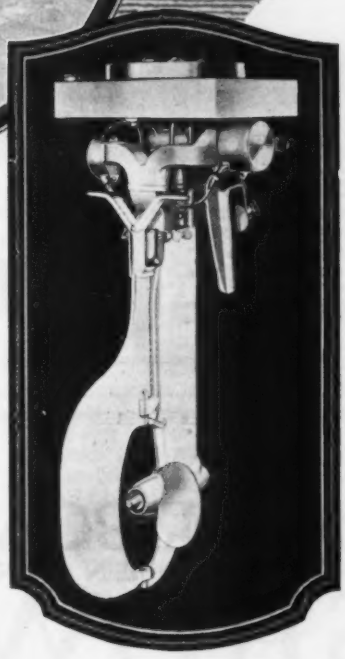
I have told in a previous issue of our reluctant decision to halt halfway to Frisco, of our overdraft on the bank of time which necessitated my return to New York. In the delightful closing hours of the cruise we wished more and more fervently that we might go on without cessation—but we steeled our determination, and after only three days in Balboa headed north again, bound for Gatun Lake and the business of putting Hippocampus out of commission for the winter months.

A week passed in unshipping spars and sails, in drying cushions

(*Continued on page* 184)

See the ELTO Exhibit at the New York Motor Boat Show February 17th to 25th

Ole Evinrude's New Motor



Lightest Weight per Horsepower — Compact!

THE Elto, Ole Evinrude's new motor, is light yet rugged; powerful and speedy; compact and space-saving; the outboard motor which ideally fulfills the requirements of yachtsmen and owners of large power boats.

A twin-cylinder, 3 H.P. motor—more power for your tender. Only 48 lbs.—an easily manageable weight to lift from one boat to the other. Folding rudder, compact construction throughout. For stowing away, less space is required than by any other outboard motor.

Atwater-Kent ignition, quick, easy starting. No noticeable vibration. Motor tilts automatically when striking obstacles in the water; can be tilted clear of the water for beaching.

The Elto has 19 big, surprising improvements. All have proved practical. Write, today, to Ole Evinrude's new organization for the Elto catalog.

ELTO OUTBOARD MOTOR CO.
Ole Evinrude, Pres.
Dept. F Mfrs. Home Bldg. Milwaukee, Wis.

ELTO
Carrying Case

The neat, compact Elto Carrying Case adds greatly to the convenient transportation of the Elto on train, street car or automobile. On hunting and fishing trips this Carrying Case serves to great advantage. It is strong and substantial, yet light. Laminated bass wood covered with durable, waterproof imitation leather. Nickel plated hinges and lock. High-grade appearance.

Elto
Light Twin Outboard Motor

GENUINE
HARTHAN
TRUE SCREW
PROPELLERS

The principle of a True Screw is strictly followed out in the patterns from which all genuine Harthan Propellers are made. This type is known to be the most efficient.

Harthan wheels are made of a special bronze composition, very tough and strong. This allows a very thin blade, the edges of which are brought down very sharp, which, with the extra high polish, reduces the power-absorbing element to a minimum.

We can supply propellers with two or three blades, in practically any pitch, either right or left hand.

Look for the Trade-Mark on Each Blade
McFARLAND FOUNDRY & MACHINE COMPANY
1100 Willow St.,
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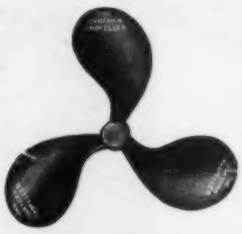
Representatives
NEW YORK: Topping Bros., 111 Chambers Street.
PHILADELPHIA: F. Vandercherchen's Sons, 7 N. Water Street.



17th ANNUAL NATIONAL
MOTOR BOAT
SHIP AND ENGINE
SHOW
AUSPICES NATIONAL ASS'N
ENGINE AND BOAT MFRS., INC.

ALL THAT IS NEWEST AND SMARTEST IN MOTOR BOATS AND THEIR ACCESSORIES — CRUISERS, SPEED CRAFT, SEDANS, LIMOUSINES, SLOOPS, RUNABOUTS, DORIES—THINGS IN WHICH THE BOATING ENTHUSIAST JUST REVELS

GRAND CENTRAL PALACE
NEW YORK
FEBRUARY 17th ~ 25th, 1922
10 A.M. TO 10.30 P.M. ~ ADM. 75¢ (INCL. TAX)

Racing at Miami

(*Continued from page* 17)

A. T. Griffith, Peoria Ill., J. S. Stearn, Ludington, Mich., Robert Ringling, Chicago, Ill., and Sarasota, Fla., Geo. Leary, Jr., New York City. W. W. Robinson, Camden, N. J., E. G. Sewell, Miami, Fla., Thos. J. Pancoast, Miami Beach, Fla., Tom. Webb, Peoria, Ill., W. B. Wilde, Peoria, Ill., T. F. Newman, Cleveland, O., A. W. Goodrich, Chicago, Ill., Fred E. Wadsworth, Palm Beach, Fla., and J. P. Stoltz, New York City.

Charles W. Kotcher will act in his accustomed position of starter and Commodore Eugene Quigley of Cleveland will act as chairman of the Timers and Scorers. Associated with Commodore Quigley on his committee are the following: E. W. Gregory, Detroit, Mich., Stanley Morgan, Detroit, Mich., Odis A. Porter, Indianapolis, Ind., M. S. Cornell, Jr., Middletown, Conn., G. T. White, New York City, A. J. Utz, Buffalo, N. Y., W. R. Gibb, Middletown, Conn., H. L Stone, New York City, Wilbur Young, New York City, F. W. Roberts, Cleveland O., Ernest Venn, Detoit, Mich, and Horace E. Dodge, Detroit, Mich.

H. R. Duckwall, of Indianapilis, Ind., H. F. Williams, of Akron, O., and Edward Crozier, of Palm Beach, Fla., will be the committee in charge of the patrol.

As usual A. C. Newby, of Indianapolis, Ind., with John Levi and W. E. Brown, of Miami Beach, Fla., will be in charge of the course.

The Hon. T. E. James, Mayor of Miami Beach, has promised to act as chairman of the Reception Committee, with G. W. Livingston, of Miami and C. S. Krom, of Miami Beach.

The Publicity and Entertainment Committee will be as follows: A. A. Schantz, Detroit, Mich., C. W. Chase, Jr., Miami Beach, Fla., C. W. Kotcher, Miami, Fla., W. D. Edenburn, Detroit, Mich, J. Lee Barrett, Detroit, Mich., R. B. Burnham, New York City, Gordon Nye, Miami, Fla., and Geo. Slocum, Mt. Clemens, Mich.

The headquarters will be at the Hotel Flamingo, Miami Beach.

In past years the southern racing has been restricted almost exclusively to runabouts. It was at Miami Beach last winter, where new world's records for runabouts for all distances were established in the 150-mile race for runabouts. It was there that the Sea Sled, Orlo II, owned by George Leary, Jr., of New York City, set a record of 40 miles an hour on a 2 1-2 mile cruise and a record of 38.8 miles per hour for 50 miles around the same course. Orlo II then went into the mile trials and established another record of 47 miles per hour.

Express cruiser racing has also been a feature of the southern races.

This winter at Miami the usual races for runabouts and express cruisers will be repeated with several new events for these boats also. In addition there will be numerous other events for other types of craft. A chance race in which all types of craft may enter will be held for the first time this winter. It is expected that this event will be very popular with the hundreds of craft which will be at Miami for the winter. There also will be a free-for-all race for runabouts, a number of handicap events for slow cruisers.

A new race this year will be an express cruiser event from Miami to Havana, Cuba, for trophies put up by a number of prominent citizens of Cuba. This race will have an international aspect to it as it seems probable that several fast boats will come over from Cuba to test their speed against the American craft. Coming back from Cuba the boats will race from Havana to Key West and from Key West to Miami.

The usual competition for the Fisher-Allison $5,000 trophy will be held on March 2, 3 and 4, and on March 7, 8 and 9 the three heats for the Wood-Fisher Trophy will be held. This is the first time that competition for this trophy has ever been held at Miami.

Gladys, a Snappy 20-Foot Runabout

(*Continued from page* 35)

General: Necessary equipment such as running-lights, anchor, and lines, fog-horn, pyrene, cushions, linoleum, etc., are not included. If boat is to be built by a builder, this can be either be included or furnished by owner. Oil, or electric lights may be used. If electric, suggest the Hacker type, combination post light (including bow lights, bitt, and flag socket.) Also, combination aft flag pole and light. Suggest 15-pound stockless or folding anchor with half-inch Manilla line. One half inch cotton line for painter lines. One pyrene, one fog-horn, one electric motor diriven horn, mounted under clam ventilator. Or regulation mouth type whistle. Cushions to be of Muleskin material and kapoc filled. Paddle and pike pole. Regulation battleship type linoleum of 3-16-inch thickness.

Advertising Index will be found on page 192

DIESEL ENGINES for PLEASURE YACHTS

IDEALIA, 84′ x 14′ x 3′, is powered with a 120 H.P. NELSECO Diesel engine which drives her 14¼ miles per hour, using only six gallons of fuel oil per hour. It would take 15 gallons of gasoline to produce the same power, *at approximately ten times the cost.*

Everyone concedes the advantages of Diesel engines for commercial boats. The case of Idealia and other successful installations prove that NELSECO engines are equally suitable for substantial pleasure yachts and large cruisers.

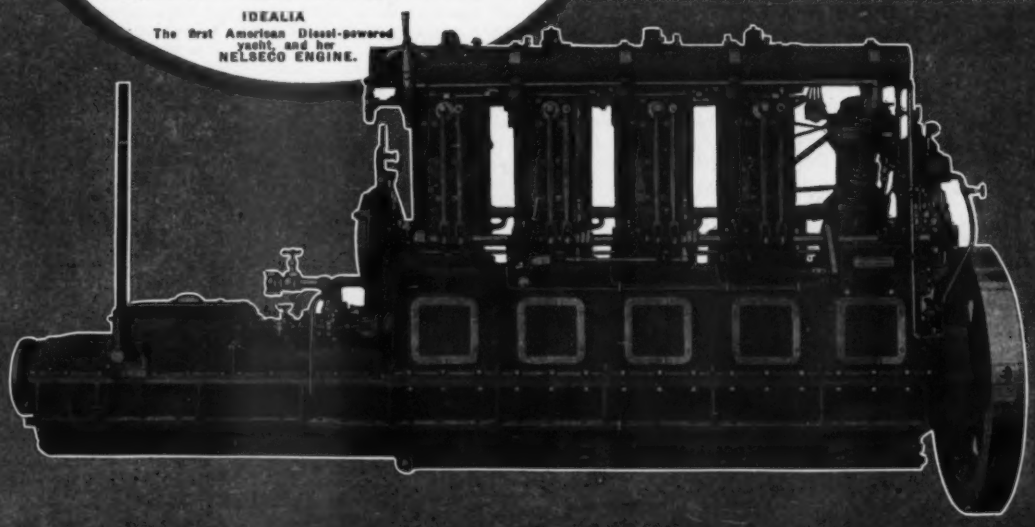
The broad experience of this company, the first to build a Diesel Engine in America for marine use, is at the disposal of those who are interested in investigating or planning a Diesel powered boat. Our engineers will take pleasure in working out your power problem if you will put it up to them. 120 B.H.P. to 3400 I.H.P.—over 150,000 B.H.P. in use or on order.

Let us send you complete information.
Give us the details of your boat.

THE NEW LONDON SHIP & ENGINE COMPANY
Groton, Conn., U. S. A.

Pacific Coast Office: 402 Exposition Bldg., San Francisco, Calif.

IDEALIA
The first American Diesel-powered yacht, and her NELSECO ENGINE.



Practical Hints on Small Boat Handling

(*Continued from page* 30)

comfort. Pass slowly over the spot selected, with your anchor stocked and ready and your cable coiled on deck, clear and ready to run. If everything looks favorable, reverse your motor and back up over the spot, letting go the hook when desired. Keep the motor in stern gear long enough to straighten out the scope and make the anchor bite. Then stop your motor and snug up for a night in port.

All cruising craft need three anchors. A light one for use in fine weather when anchoring for lunch or to catch a few fish. A service anchor for general use when anchoring over night and which should be considerably heavier. And a heavy emergency anchor stored perhaps beneath the cockpit floor with cable to match and to be used in bad weather, when forced to anchor outside or on a lee shore. Maybe this latter anchor will never be wet, but the feeling of security it gives will be worth its cost and more.

The weights of anchors and sizes of rode lines and chains have been frequently tabulated. For a thirty-five foot raised deck cruiser, I should carry a twenty-five pound light anchor, a forty pound service anchor and a seventy-five pound heavy anchor in reserve. Cables of thirty to fifty fathoms in length and from 5/16 to 1 inch diameter should be provided for the different hooks. Chain is unnecessary on small craft and a windlass may be dispensed with on any cruiser up to thirty-five feet.

The Dinghy

The dinghy presents a problem not easy of solution. On any craft of the size we are now discussing, she is a necessity and must be towed astern, since any cruiser under forty feet has no business to carry a dink on davits or even lashed upside down on deck. I have personally found that a twelve foot dory skiff makes a fine little tender. She was seaworthy, easy to row, towed well, and was not bad to look at. I towed her on the after slope of the second stern wave and she behaved well even in rough water with no longer towline than this. Another thing, these boats do not exhaust the bank account.

I would right here say a word regarding landing on a beach through surf. The surf from seaward does not look as heavy as it really is, so be careful. Keep your boat always at right angles with the line of breakers. Use all speed possible when running in on an advancing breaker and jump overboard the instant she touches the sand and rush the boat up the beach.

It may sometime be necessary to run up alongside of a moving steamer in a small boat and throw or take a line. The big boat will be moving faster than you can realize. Head the way the vessel is going and when she is alongside, take her line from forward but do not get too much weight in your bow or she may drag under, use plenty of line and do not snub her too abruptly. Do not tow too far aft as you might get mixed up in her wheel if she is light.

Outfitting

In outfitting a small cruiser, too much stress cannot be laid on securing strong, durable articles of deck hardware and equipment. The steering gear in particular must be as nearly trouble-proof as can be devised. The ground tackle, fire extinguishing equipment, bilge pumps, running lights, tool outfit, fuel storage, electrical outfit, all deserve the most painstaking care in selection and maintenance. Charts of all waters in your vicinity should be carried in a water tight case always ready at hand.

When cruising, take along a camera and keep a log which you can illustrate with snapshots taken at opportune moments during the out. Record all happenings in the log. When you left the Yacht Club, when you passed this headland or that lightship. When the weather changed and who was in the bunch that came aboard to supper that evening. Souvenirs like these are beyond price and keep alive the charm of motor boating during these long winter evenings when the good old summer time seems a long way off.

Some Tidal Data

We have learned how important it is when nearing the land in foggy weather or when in doubt, to take casts of the lead and by plotting these soundings on a piece of tracing paper on the scale of the chart, and laying this plot on the chart until the figures agree, to obtain the true position of the vessel.

The figures given on the chart are however for chart datum, that is, on the Atlantic Coast of North America, except British America, for mean low water; on the Pacific Coast of North America, it is lower low water than is shown, for Central America and Mexico mean low water springs, and for the rest of the world approximately the same is used. So the charts show the depth at their various positions when the tide is at that level, but it very seldom is. At high water it may be as much as forty feet or more deeper, with varying amounts between. Thus to make a correct comparison it is important that the soundings observed with the lead should be reduced to the level of the soundings given on the chart. This reduction is also useful for ascertaining the depth of water on the bar of a river or harbor.

It might be thought that this would be just a simple sum in proportion, that if the tide fell 12 feet in 6 hours that two hours after high water it would have fallen 4 feet, but in fact it would have fallen about 3 feet, as the tide rises and falls in what is known as a harmonic curve. The process being slow towards slack tide and rapid at half tide.

Provided the rise and fall is regular, it is not difficult to construct a diagram which will give the height of the tide above Chart Datum, which is equivalent to the amount to subtract from the soundings as shown on the lead line, to make them agree with the chart at any time and place.

Where the tides are very erratic, neither this nor any other method is reliable. In some places there are four tides a day and at others only one, and so forth. Luckily these places are rare and we have in the Tide Tables reliable data for most of the coasts of the world.

On the Lakes, some parts of the Pacific coast (at the nodal line) and elsewhere that the tide does not rise and fall more than a few feet reduction of the sounding obtained is, of course, unnecessary.

The best and most accurate method is by means of tidal diagrams, which may easily be constructed on a piece of ruled paper. The method of making and using them is fully described under Figs. 269-271.

The following table is simple but not quite so accurate. It is calculated for a six hour tide.

To Ascertain the Height of the Tide Above Low Water at Any Hour of the Ebb or Flood

By multiplying any given rise of the tide, spring or neap, by the constant given in the table, the height of the tide at that time can be found at any hour.

Falling Tide After H. W. H. M.	Rising Tide After L. W. H. M.	Constant for 6 hours Ebb and Flood
0.0	6.0	1.0
0.3	5.3	0.96
1.0	5.0	0.92
1.3	4.3	0.84
2.0	4.0	0.75
2.3	3.3	0.63
3.0	3.0	0.50
3.3	2.3	0.38
4.0	2.0	0.26
4.3	1.3	0.16
5.0	1.0	0.08
5.3	0.3	0.025

For example a tide rising 15 ft, 2 hours after High Water, would be 15 × 0.75=12 ft. above low water, or on the rising tide 2 hours after L.W. 15 × .25= 4 ft.

More than one large vessel has been battered to pieces by neglecting these reductions, anchoring at high tide, and being left high and dry at low water.

Others have anchored at low water, lifted their anchor as the tide rose and drifted ashore, and many a vessel, large and small, has been misled and got into trouble by comparing their casts with the chart without making corrections.

The Lead

Singularly enough, the lead, the simplest device used by the navigator, is the most essential yet so often neglected. In no class of mariners is it more neglected than among motor boatmen. They seem to depend too much on seeing the bottom or otherwise detecting shoal water. This is unseamanlike, at least, and often leads to serious inconvenience and sometimes to disaster. Navigators in general omit the use of the lead, not through the desire to avoid the trouble of sounding, but through an over confidence in their position. In this connection it is always well to bear in mind an admonishment to the navigators of His British Majesty's vessels, directing them not to know their ship's position, lest through an unwarranted confidence they are led into dangerous waters. But rather with all available evidence at hand be always on the alert for more information to refute or confirm their position.

The ordinary hand lead line comprises nine marks and eleven deeps. The latter being the term given to the fathoms having no marks. The lead line is marked as follows:

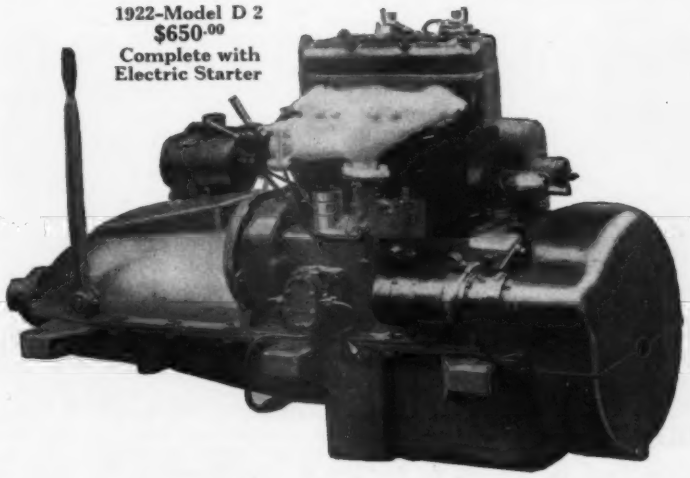
Two fathoms from the lead.....Two strips of leather
Three fathoms from the lead.....Three strips of leather
Five fathoms from the lead.....White rag
Seven fathoms from the lead.....red rag
Ten fathoms from the lead.....leather with a hole
Thirteen fathoms from the lead.....three strips of leather
Fifteen fathoms from the lead.....white rag
Seventeen fathoms from the lead.....red rag
Twenty fathoms from the lead.....cord with two knots

It is essential that a line be soaked in water before marking it owing to the contraction of the material.

(*Continued on page* 176)

Scripps

1922-Model D 2
$650.00
Complete with
Electric Starter



In order to show the world the reliability of our motors we built "The Detroit," a 35' x 8' motor boat, equipped with a 12-15 H.P. SCRIPPS MOTOR, and ran her, under her own power, every inch of the distance from Detroit, Michigan, to St. Petersburg, Russia (now Petrograd). The start was made from Detroit on July 2, 1912. She arrived in St. Petersburg September 13, 1912—6008 miles with ABSOLUTELY no trouble. Ask Thomas Fleming Day, her skipper, or Walter Moreton of Boston, they will tell you. No other manufacturer has dared to attempt a similar demonstration of reliability. A Scripps Motor will run when nearly upside down, as demonstrated by Larsen's trip through the Niagara Rapids in October, 1911. Do these wonderful demonstrations of reliability and stamina mean anything to you?

Ask Yourself—

Do I want a real marine engine—made by a well known manufacturer that has had the time tried experience necessary to the development of a marine engine and in that business to stay? Or will I be penny wise and take a chance with something else intended for an entirely different field where its failure to make good or sell now forces its makers to dump it on the unsuspecting motor boating public with eleventh hour alterations supposedly fitting it for marine work?

Performance, not Promise, Has Made the Scripps

You can't navigate very far on a gambler's expectations. "Safety at Sea" is more important than "Safety First" on your streets. You can't be too careful in selecting your power-plant—make sure you're not running an experimental department for something new or untried, or that is baited with little more than a low price inducement. In marine equipment there is nothing so expensive and disappointing as makeshifts or cheapness from the standpoint of economy, safety or enjoyment. It will cost you little more to install a Scripps and experience real lasting satisfaction.

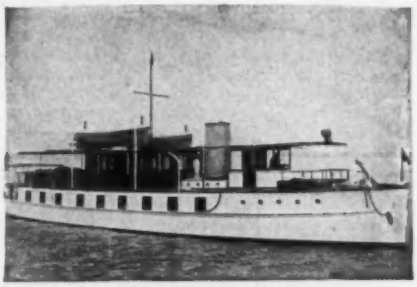
For seventeen years Scripps engines have never failed to live up to their reputation of being unusually fine engines—a more reliable or adaptable engine has never been built—because in all these years the Scripps Organization has followed steadfastly but one ideal, and that to build better. A good engine cannot happen over night. Years of toil and honest endeavor have made Scripps reputation world wide. Its quality, endurance and reliability are as well known to the motor boating public over-seas as at home, and wherever yachtsmen congregate Scripps performance is a by-word. With the ruggedness and absolute dependability that have built Scripps reputation in the past are linked the exacting refinements and other motor conveniences of the present.

Your boat will mean a whole lot more to you with a Scripps installed. Investigate, two, four, and six cylinders, 10 to 125 H.P. gasoline or kerosene.

SCRIPPS MOTOR COMPANY

5819 Lincoln Avenue **DETROIT, MICH., U. S. A.**

"Every Moving Part Enclosed"



IN FLORIDA—OR ANYWHERE

a trim, roomy houseboat like our Luneta, built for Col. S. L. H. Slocum, Washington, D. C., would create admiring interest in her every port of call.

Add One More Florida Season

to the roll of Mathis triumphs—continuous year after year since the appearance of the first Mathis-built Houseboat back in 1909.

Continuous triumphs, because each year has seen new features—which added more comfort, more convenience and greater ability to go anywhere—included in

MATHIS-BUILT HOUSEBOATS

While in Florida, grasp any opportunity you may have to inspect one of the Mathis fleet at close range. It will make apparent why they have been the personal choice of some of the best known people in America.

MATHIS YACHT BUILDING CO.

Specialists in Houseboats and Cruisers from 40 to 120 ft.

Cooper's Point Camden, N. J.

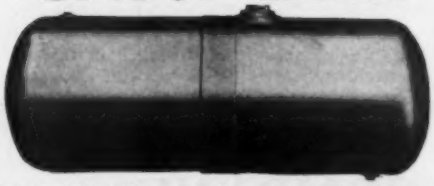
GAS TANKS

HE FEARS NOT SPARKS

whose motor boat is equipped with a

"JASCO TANK"

SEAMLESS



LEAKLESS

ALL SIZES—QUICK DELIVERY

NEW BOOKLET NOW READY

FOR

BOAT DESIGNERS & BUILDERS

JANNEY, STEINMETZ & CO.

1421 Chestnut St. Philadelphia

30 Church St. New York

Gar Jr. As An Ice Breaker

(*Continued from page 23*)

unnecessary except when attending to duties on deck.

The run down the river and across New York Harbor was made in almost less time than it takes to tell it. Passing whistle signals to other craft were unnecessary as we had so much more speed than the others that we just darted across their bows or astern of them without effort. We ran inside of Staten Island, through the Kills and then up the Raritan River to New Brunswick, a total mileage from the Columbia Yacht Club of forty, which we covered in very quick time.

As we obtained our clearance at the entrance to the canal at New Brunswick we received our first shock. A government tug coming out of the canal hailed us, "Going through?" "Well, you want to be good at ice breaking." Further questioning brought out the information that the canal was frozen solid for many miles and that the tug had required all morning to make a short run. Of course, the tug had broken a passage through but this might freeze again any moment.

Now, Gar, Jr., was designed to make speed, not to break ice. Her mahogany finish was in the best of shape and all on board looked as one person down toward her sharp but graceful, yet delicate bow. A council of war was hastily called—should we return and try the 300-mile outside run or should we take a chance with the ice? The latter program was decided upon as so far in her career nothing had ever stumped Gar, Jr., and conquering ice fields would be further laurels to add to her crown. Therefore, "Let's go," it was decided.

Before getting underway even in the canal we located a lumber yard and procured a piece of maple planking about fourteen feet long by twelve inches wide. As the first ice to be met was thin, probably about one-half inch thick, and had been broken up by the tug, we thought we'd experiment a little to see how Gar, Jr., was able to push through it. We found that there wasn't any trouble from this source for the cruiser just went along as though there weren't any obstruction at all, cutting through it like a razor, and occasionally pushing a big sheet of ice high up on the banks of the canal before it had time to break into a million pieces. The faster the boat was speeded up and the higher she rose in the water, the greater was the destruction of the ice field. It was a great sight to be way up in the bow of the boat and look down and see the ice being broken into a countless number of small particles, each one trying to beat its neighbor in rapidity of getting out of the way of the on-rushing monster. No ice breaker designed especially for that purpose could have accomplished its object more effectively.

We kept up our ice pushing until we reached the next lock only a short distance ahead and there decided that it would be best to make up some sort of an ice breaker to attach to Gar Jr.'s bow so that the brunt of the ice's force would not come against the bow planking. So we took the maple plank and cut it in half and mitered the pieces together at one end into a V-shape piece. We then made this fast to the bow by means of lines to the deck and again started on our way.

The ice breaker worked to perfection. We no longer had to slow down for fear of injuring the bow planking. Most of the ice was broken and floating and was pushed aside with very little apparent effort. The effect upon the speed was not noticeable, neither was there any vibration.

As we approached the City of Trenton at dusk the ice entirely disappeared so we thought our troubles were over and took in our plow. We had dinner at Trenton which is only six miles from the terminus of the canal and then decided to push on toward the Delaware so as to be ready for an early start the following morning. We had only made a half mile, or thereabouts, when new troubles began. To the eastward of Trenton the canal had been kept fairly free of ice by considerable navigation but we found that to the westward no boat had passed through for several days. The ice here was not only not broken up but was frozen solid. We had to again put the plow in place but even this was not sufficient as it was not high enough and the ice would crawl over the top of it and strike the planking with great force. It was pitch dark so after about 100 yards of this kind of sailing we decided that we had had enough of it so decided to remain for the night just where we were. And no anchor or lines to the shore were necessary either. When the sun came up in the morning we had a chance to look over the situation and it was rather discouraging. There apparently was four miles of solid ice ahead of us, before we could reach the free waters of the Delaware. Astern of us was forty miles of canal. There was not much to choose between the two except that it was certain that the only thing to do was to push on, ice or no ice. To do this would require a better ice breaker and to provide this wasn't such an easy matter in the wilderness where we were. We walked back on the tow path a mile or so to the nearest lock tender's house and there bribed the occupant to let us tear apart a wrecked boat which was hauled up on the canal bank. We decided that the two sides of the boat's trunk cabin would be just right for an ice breaker if attached to the one we al-

(Continued on page 188)

Hacker-Craft

A New Hacker Craft, 25-Footer, for 1922

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HACKER BOAT CO.

1525 Crane Avenue **Detroit, Mich.**

Practical Hints on Small Boat Handling

(*Continued from page 172*)

These marks have been devised for ready recognition in daylight and easy distinction at night by the sense of touch. A toggle is often seized at the two-fathom point, or if the size of the boat makes it more convenient to swing the lead, at the one-fathom point. Around those depths near the draft of the ship where soundings become critical the line is usually marked at every foot.

When offshore in deeper water a thirty or fifty pound lead is used and the line is marked as follows:

At every ten fathoms (after the first ten) a piece of cord with two knots for twenty, three knots for thirty, and four for forty, etc. Between these at twenty-five, thirty-five and forty-five, etc., is a piece of cord with one knot.

It is not every seaman who can heave the hand lead, and there seem to be fewer who are skilled in this operation as years go by. The United States Coast Survey has some of the finest leadsmen in the world, and in this service skill of this character is appreciated. Not only must the soundings be read accurately when the lead line is up and down, but the lead must reach the bottom. This is not always easy when the water is sixteen fathoms deep and the ship is moving along at four or five knots.

There was a celebrated leadsman named Collins in the Coast Survey service during the Civil War and after, who was an extremely valuable man. He was selected by Captain Platt, the pilot of the Monitor fleet, to stand out on the flush deck of the Weehawken, and report the depths to the conning turret during the famous attack on Charleston. As the fleet moved in over the bar, Collins standing on the cleared deck was a conspicuous and splendid target for the Confederates. But even as the enemy's shells began to land close about the Monitor he called out the depths in the usual sing song voice of the old-time leadsman. And so he continued while the Weehawken was unmercifully showered with shots that played a terrific tattoo on her armored turrets. At length Captain Platt ordered him in, but Collins replied "I'll stay as long as you need 'em, Captain."

This recalls another of Collin's originalities; Captain Platt in command of the Survey steamer Bibb, was a consummate seaman, and thought very highly of his leadsman Collins. This was more than could be said of a watch officer then aboard, who could not be wholly depended upon when in the vicinity of shoal water. Collins at the lead would sing out the soundings in a voice easily heard on the bridge as long as the depths allowed a good margin beneath the vessel's keel. But as the water shoaled his voice would rise in proportion until Captain Platt would hear the depths in his room and come bounding on the bridge, thereupon Collin's voice would immediately resume its usual tone.

It was the older custom for the leadsman to give the depths in a monotonous singsong voice naming the nearest quarter fathom, as, a quarter less seven, and, a half six and so on. Often in more accurate work like surveying the depths are given in three numbers, as, five-three-four, meaning five fathoms, three feet and four-tenths. The operation of heaving the lead looks easier than it really is. The lead should be swung slowly, then with the arm straight send it over the head using the whole body giving at the end the added strength of the arm, and sending it ahead as far as possible. The vessel coming up as the lead sinks should find it on the bottom abreast the leadsman in order to have the line up and down. He takes in any slack as the lead sinks, and taps the bottom feeling its character, either, rocky, hard, sticky or soft.

In sounding at night the leadsman takes note of the distance from his hand to the water and subtracts this from each depth obtained.

When in over fifteen fathoms a deep sea lead of thirty or fifty pounds is used. In casting this lead the line is passed forward from aft outside of everything, and on the forward deck the lead is bent on. The vessel is stopped and the lead hove over. The depth is taken by the mate stationed aft. It is more usual in these days on larger vessels to use a sounding machine. This apparatus comprises a standard supporting a scored wheel carrying along length of wire. The lead is bent on the end, and there is also a small brass tube, with holes in the bottom, seized to the line. Into this is inserted a hollow glass tube, the inside of which is coated with chromate of silver, and the upper end sealed. As the lead sinks carrying the brass tube, the water is forced up the glass tube by the pressure and vanishes the red chemical by its contact. The amount of chemical remaining is measured in a guage scaled to fathoms. In the bottom of these heavy leads is a hollowed cavity into which soap is compressed. This is called arming. By this means a specimen of the bottom is obtained. The character of the bottom given on the charts in harbors, aids the master to pick out an anchorage on a sticky, mud or soft bottom, where his anchor will be in good holding ground. Offshore it aids him in locating his position when taken in conjunction with soundings. By this means it can be determined whether a vessel is on the French or English side, or in the middle of the entrance to the English Channel.

Soundings are taken for two purposes—to ascertain the depths for safety, and for information to assist in locating the ship's position. In fog navigation, or overcast weather when no sights can be obtained, the lead is often an invaluable friend of the navigator. A great aid in this connection are the contour lines on the charts. They are drawn at one hundred, fifty, twenty, ten and five fathoms. These lines represent what would be the shoreline if the sea level were reduced by these amounts. Then on the larger scale charts there is the sanded area which denotes the three fathom curve, and again, within it, is emphasized the two and one fathom lines. It is thus made known that if a sounding of less than fifty fathoms is obtained the ship must be inside the fifty fathom line.

A convenient procedure is to sound at regular intervals, say, every half hour, and maintain a speed of eight knots; then with a strip of paper marked every four miles to scale, and the time and depth of water opposite each mark, move it over the chart always in the direction of the ship's course until the soundings on the paper correspond with those given on the chart.

The writer has only recently had several very satisfactory experiences in lead navigation. Notable among these was working a vessel around Wimble Shoals off the North Carolina coast last winter. Under instructions the vessel was kept inshore, but through thick weather and heaving to for engine trouble the position was a source of some anxiety when the ship was to be brought into such close proximity to dangerous shoals in a black night with a heavy rain, lumpy sea and winter time. Many hours before the danger was reached soundings were taken every half hour and the chart studied with the greatest diligence. The above mentioned strip of paper was moved back and forth in every conceivable position. It was noted that the ten fathom curve ran SExE, if remembered rightly, along the northeastern side of Wimble Shoals. Bearing this fact in mind immediately upon obtaining a sounding of nine fathoms the ship was headed off SExE, and the subsequent depths showed her as running approximately along this curve. When sufficient distance had been run the course was hauled to the South while the lookouts strained their eyes for a glimpse of the gas buoy in the rainy blackness. It was with great relief and immense satisfaction that the flash of the buoy was made out for a moment one-fourth mile on the starboard beam.

Another gratifying bit of lead navigation was experienced early this spring when approaching New York from the West Indies. There had been a couple of days with no sights, but when the vessel came on to soundings the depths agreed fairly well with those of the dead reckoning position. The course lay obliquely across the prehistoric bed of the Hudson River, which exists as a remarkable gully for a distance of sixty miles off Sandy Hook. In it at our point of crossing are depths of thirty-six to forty fathoms with twenty-two to twenty-four on the adjacent sides. A depth of twenty-three fathoms was obtained, the next dropped into the gully with thirty-six, and in half an hour, having crossed, twenty-four fathoms was reported. So convincing was the evidence in checking the dead reckoning position that a course was laid for Ambrose Lightship which was made out, though somewhat foggy, as anticipated nicely on the bow.

These two cases are not at all unusual but are cited to show the value of the information given by the lead, but it must be used with discretion.

What applies to larger vessels in the use of the lead also applies to smaller vessels, and motor boats, more so in a way, because they frequent the shoaler water. So it is hoped that fewer boats will go ashore for lack of sounding with the lead.

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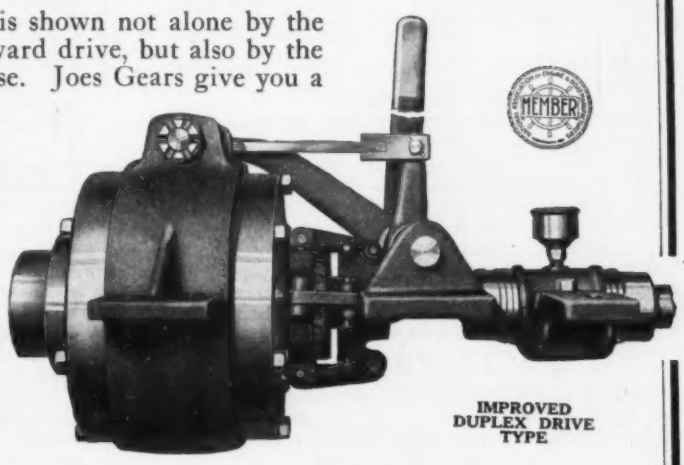

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The Mystery of the Screw Propeller

(*Continued from page* 38)

and V_1 the speed AD with which the propeller advances through the water in which it works, we have the relation

$$\text{wake fraction } w = \frac{DB}{AD} = \frac{V - V_1}{V_1}$$

and by the aid of a little arithmetic, this becomes

$$V = V_1 (1 + w).$$

When a vessel is towed through the water it offers a certain resistance to motion called the tow-rope resistance because this resistance is usually determined by towing a model in an experimental tank. When the vessel is driven by its own propeller, the propeller has the effect of sucking the water away from behind the vessel, which is equivalent to increasing the resistance of the vessel to motion through the water, also the angularity of the currents entering the propeller reduces the propelling effect. Therefore, in order to propel a vessel through the water, the thrust of the screw must be greater than the tow-rope resistance of the vessel.

Call the thrust of the screw T; the tow-rope resistance R; and let t denote the percentage of increase in resistance due to the suction of the screw and deflection of the currents entering the propeller. Then we have

$$R = T (1 - t).$$

This fraction t is called the thrust deduction.

The actual work of propulsion must, of course, be equal to the tow-rope resistance R of the vessel times the speed V at which the vessel moves, i.e.,

$$\text{Work of propulsion} = R V.$$

Substituting the above values of R and V in this product, we have

$$RV = TV_1 (1 + w) (1 - t).$$

The word power in mechanics simply means the rate of doing work, or the amount of work done per second. The term RV, therefore, stands for the work of propulsion done per second, or, as it is usually called, the effective power. Similarly the term TV_1 is the rate at which the thrust of the screw is working in the water immediately surrounding it, and is called the thrust power. The factors $(1 + w)$ and $(1 - t)$ represent the effect of the hull on the action of the propeller, and their product $(1 + w)(1 - t)$ is called the hull efficiency. For example, for a 10% wake and 10% thrust deduction we have $1 + w = 1.10$ and $1 - t = .90$; consequently, the hull efficiency in this case is $(1.10)(.90) = .99$ or 99%. Without going further into this question, it is at least apparent that the form of the hull is an important factor in propeller design.

The other fundamental condition determining the size and form of propeller is, of course, the characteristics of the motor which drives it. An engine of any type works most efficiently over a limited range of speed, and it is therefore necessary to design the propeller to suit the most favorable speed of the motor, and such that the torque power required to turn the propeller at this speed shall be exactly equal to the power developed by the motor at the same speed. Otherwise, the motor and propeller will either speed up or slow down, and in consequence will pass out of the most favorable range either of engine performance, or propeller performance, or both. This consideration ought to make it clear that it is foolish to expect satisfactory results when a propeller is selected by guess from stock patterns, as the odds against guessing exactly right are about a million to one.

It is generally known that when a propeller is overloaded, or when it is too near the surface, cavitation may be expected to occur, and no one need hesitate to admit that this is about all he knows regarding cavitation for it is practically all that anyone knew about it until comparatively recently. By cavitation is meant the formation of cavities, filled with air or vapor, on one or both sides of the propeller blades. When this occurs, the thrust, of course, drops very rapidly, as the propeller is no longer working in a medium of the same density as before. The only cure which propeller manufacturers seem to have found for cavitation so far is that of increasing the area of the propeller, which usually means increasing its diameter. This change, however, affects the propeller torque and therefore upsets all previous calculations.

The subject of cavitation has been carefully studied both experimentally and theoretically during the past ten years, and considerable information is now available. One experimenter has made a very extensive series of stereoscopic photographs of propellers working in water, and the results of his investigations seem to be the basis for the method of surface propulsion now widely advertised. From theoretical investigations it has been found, however, that by slight changes in design, more particularly in the trailing edge of the propeller, the point at which cavitation occurs, may be raised to a much higher speed than for the present standard type of propeller.

The present method of propeller design is based almost entirely on experience, and consists largely in slight modifications of existing types which have proved satisfactory. The main features of design are determined arbitrarily, the blade section and contour both being assumed at the outset. The ratio of the projected area of the blade to the area of the propeller disc is then made to lie within certain prescribed limits, the most favorable value for this ratio as determined by experiment being about .2. The lower limit for the diameter is based on the condition that the thrust per square inch of developed blade area shall not exceed a definite amount, usually assumed as from 12 to 16 lbs., while the upper limit for the diameter is determined by structural conditions and the torque power of the engine. This work is largely a matter of drafting room procedure, and with this routine so thoroughly established, there is little opportunity for improvement beyond that existing within the range of standard designs. At most, this method of individual design is only applied to large and important vessels. In motor boat practice, the builder simply selects from stock patterns the propeller which, in his judgment, is most likely to prove satisfactory.

The theoretical basis of propeller design so far as it follows rational methods is the so-called impact theory. By this is meant simply that the impact of the blades striking the water pushes the water backward and thereby creates the thrust which drives the vessel. There are several well known facts, however, which the impact theory is powerless to explain. In the first place, experiments in aeronautics have proved that propeller action depends very little on the pressure exerted on the so-called pressure side of the blade, but is due largely to the decrease in pressure produced on the opposite or suction side of the blade. A second well known fact is that when a propeller is working properly, that is, in accordance with the conditions for which it was designed, the angle which the inflowing fluid makes with the pressure side of the blade is either zero, or at most not over two or three degrees, and consequently the impact of the fluid against the blades cannot be a large factor in producing thrust, as the impact theory requires.

A rigorous theory of propeller action must be based on the laws of fluid flow, usually called hydrodynamics. It is intended to keep this article within popular limits, but to avoid misunderstanding it seems absolutely necessary to explain the technical meaning of the term hydrodynamics. Probably this term is usually thought to mean the same as hydraulics, that is, anything associated with water. Its scientific meaning, however, is very different, and is limited to a very definite field. Hydrodynamics in this connection means the study of the flow of fluids based on Euler's differential equations of motion, and proceeding by means of conformal representation to map the lines of flow and pressure distribution in the fluid, finally arriving at recent special developments as applied to propeller action, such as the circulation around a single blade, the composite flow around a succession of blades, the study of vortex motion, and of surfaces of discontinuity, and many other results which it is not necessary to mention.

This subject is not so formidable but that everyone can

(*Continued on page* 184)

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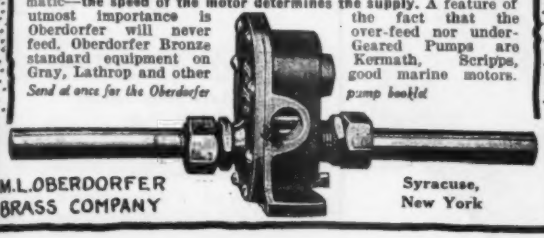

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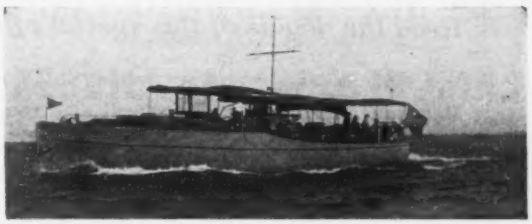

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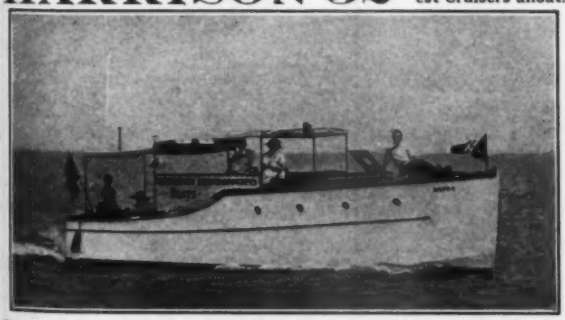

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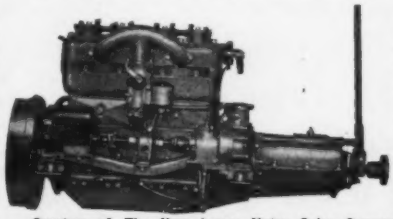

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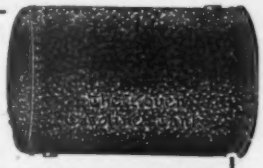
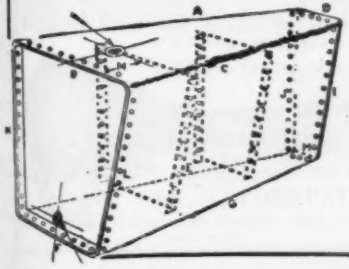




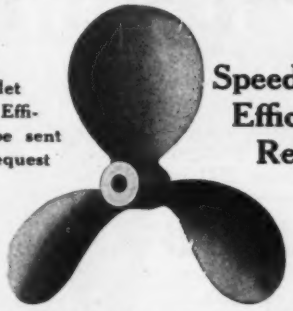
L. O. KOVEN & BROTHER

Main Office,
158 Ogden Ave.,
Jersey City, N. J.

Branch, 50 Cliff St.,
New York City.

HYDE TURBINE TYPE PROPELLERS

Our booklet "Propeller Efficiency" will be sent free upon request



Speed
Efficiency
Reliability

HYDE WINDLASS CO., Dept B. Bath, Maine, U.S.A.

Save Two Thirds Cost—By Building Your Own Boat
OUR PRICES ARE LOWER
BROOKS—OLDEST established BOAT BUILDERS

BROOKS KNOCKED DOWN OUTFITS make Boat Building a pleasure. You can easily build a boat in your spare moments this winter. Quick and perfect results can be obtained by using this simple method. BROOKS MATERIALS are all especially selected and of highest quality.
Let us furnish you with plans or KNOCKED-DOWN OUTFIT or build you a COMPLETED BROOKS BOAT. Our models are of the latest designs, handsome, staunch and seaworthy.

Send 10c for BIG descriptive catalog, full of general information for prospective Boat buyers.

BROOKS MANUFACTURING COMPANY
2423 Brooks St., Saginaw, Mich.

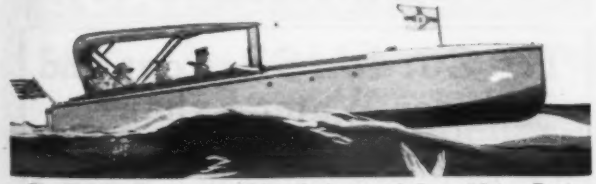
GRAY-ALDRICH COMPANY, INC.
84 Atlantic Ave., Boston, Mass.

REBUILT ENGINE BARGAINS

ALL ENGINES THOROUGHLY REBUILT UNLESS OTHERWISE SPECIFIED

255	36	H.P.	Lathrop, 3 cyl. 2 cyc. with rev. gear	$ 490.00
275	80	H.P.	Wolverine, 3 cyl. 4 cyc. propeller & rev. gear	2000.00
277	16	H.P.	Lathrop, 2 cyl. 2 cyc.	285.00
299	24	H.P.	Lathrop, 2 cyl. 2 cyc. no rev. gear	350.00
302	5	H.P.	Wolverine, with rev. gear	175.00
312	20	H.P.	Lathrop, 2 cyl. 2 cyc.	380.00
329	24	H.P.	Lamb, 4 cyl. 4 cyc. with rev. gear	449.00
351	32-37	H.P.	Standard 4 cyl. 4 cyc. rev. & magneto, as is	590.00
354	100	H.P.	Fairbanks-Morse C. O. 4 cyl. new, with propeller equipment	6200.00
355	35-40	H.P.	Scripps, 4 cyl. 4 cyc. electric starter and magneto, as is	650.00
357	135	H.P.	Van Blerck, electric starter and magneto, as is	750.00
358	11	H.P.	Ferro, 2 cyl. 2 cyc., reverse and prop., as is	165.00

Trenholm Fuel Vaporizers for using kerosene fuel on 4 cycle engines. Vaporizer circular on request.



The Speedy Runabouts, Trim Cruisers and Open Motor Boats bearing the Racine Ware trade-mark give their owners keen pleasure and complete satisfaction.

We also build standardized runabouts, open motor boats, special boats for outboard motors, rowboats, and the famous Racine Ware line of canoes. We will design and build a boat according to your specifications.

Tell us the kind of a boat in which you are interested and we will mail you descriptive catalog.

RACINE BOAT COMPANY, 1908 Holman Street Racine, Wisconsin
Pioneer Boat Builders of the West

Electric Searchlights
ARC OR INCANDESCENT

A Searchlight for any purpose. Arc Searchlights for 110 volts. Incandescent Searchlights for low voltage. In sizes from 7 inch to 60 inch. High efficiency. Moderate price. Special glass mirror. Sturdy cast bronze fittings.

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WOOLSEY COPPER PAINTS

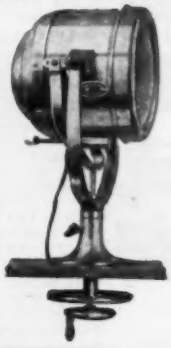
and MARINE PAINT SPECIALTIES ARE THE WORLD'S STANDARDS

Copper Paints—Brown, Red and Green, Yacht White, Deck Paint, Marine Mixed Paints, Metal Bottom Paint, Seam Paint, Seam Compounds, Sparon (Spar) Varnish, Engine Enamels, Canoe Enamels, Boat Bottom Seam Compound, Copper Bronze, Light Sea Green and Regatta Green Yacht Bottom Paints, etc.

C. A. WOOLSEY PAINT & COLOR CO.
Jersey City, N. J., U. S. A.

Send for our Marine Booklets, Free—Contain Color Spots and Information "How to Paint a Boat."

A Real, Low-Voltage Searchlight!



THE most powerful searchlight of the incandescent type.

Unlike anything you have ever seen.

Built entirely of brass with our own specially designed heavy glass reflector and bulb.

Furnished in three sizes: 7, 10, and 14 inch for 6, 12, 24, 32 volts.

Finished in Polished Brass, Black, Nickel, and Battleship Gray.

Projects an intense beam of 116,000 to 530,000 Candle Power a distance of One Half to One Mile, depending on size of searchlight and voltage.

Send for Catalog

SOUTHLAND STEAMSHIP COMPANY
Lobby Products Department
Savannah, Georgia

"LIBERTY KID"

The Best Little Medium-Duty Marine Engine on the Market

High grade four cycle design, valve-in-head, removable cylinder head, bronze rocker arms, push-rods, plunger pump, etc. Over 200 in actual use.

Immediate deliveries on early orders. Write for catalog and testimonials.

AGENTS AND DEALERS WANTED

A. G. HEBGEN
Manufacturer and Sole Distributor
440 Market St., San Francisco, Cal.

3½-4 H.P. 600 to 750 R. P. M.

Also built in "Liberty Twin" Double Cylinder Model giving 8-10 H.P., for gasoline or kerosene

INCROYABLE

is French for unbelievable

The tremendous carrying power, brilliant tone and small air consumption (1/10 that required by a whistle) of the

"STROMBOS"

is almost *incroyable.* "It was so loud that at first I was ashamed to sound it its full strength. They heard me five miles away. It was almost unbelievable".

MOST POWERFUL OF ALL SIGNALS

Write for description

AMERICAN STROMBOS CO., Inc.
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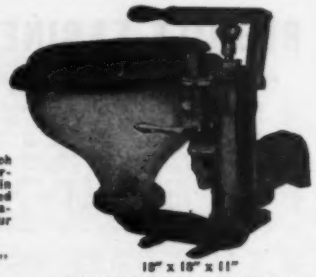
Pioneer Specialists in Marine Sanitary Fixtures

Since our advertisement" appeared in the first issue of MoToR BoatinG, December, 1907, hundreds of Curtiss fixtures have been installed in motor cruisers and yachts of all sizes, including some of the finest boats launched within this period.

The Curtiss line is exceptionally complete, varied in type, size and price to meet every possible requirement. Each model has been designed in accordance with our wide experience in boat work and can be depended upon in quality, service and durability no matter whether it is our highest or lowest priced model.

"PRICES ON APPLICATION"

THE J. H. CURTISS CO.
2 South Street, New York



18" x 18" x 11"

The best little closet on the market today, possessing many of the advantages of the large size toilet. All brass and porcelain. Oak seat and cover.

Built by
LUDERS

The Last Word in Yacht Designing and Building

Luders Marine Construction Company

Stamford, Conn.

Masten

TRADE MARK

New York Distributors for Caille Motors and Regal Gasoline Engines. Caille 5 Speed Outboard Motors

Owners and Exclusive Makers of Masten Patent Reversible Life Preserver

Manufacturers of Boat Tops, Spray Hoods, Life Preservers, Cushions, Swimming Belts, Cabin Upholstery, Draperies. Builders of Row Boats, Motor Boats, Runabouts, Cruisers.

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The Gordon Silencer and Under-Water Exhaust

No Noise — No Smoke
No Pounding — No Grease
Does not retard motor

With Fresh or Salt Water Fittings
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$12.00

The Gordon Propeller & Mfg. Co.
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Advertising Index will be found on page 192

YACHTS -- CRUISERS -- HOUSE BOATS

Experience Teaches — Hence the reason that once an owner of a New York Yacht Launch and Engine Craft always an owner. Many years experience in high class Yacht Design and Construction are at your service.

20th CENTURY MOTORS

400 to 500 R. P. M. Heavy Duty Type Four cycle. Bore 6½", Stroke 8"

2 cyl. 15-20 B. H. P.
4 cyl. 40-50 B. H. P.
6 cyl. 65-75 B. H. P.

NEW YORK YACHT LAUNCH & ENGINE CO., Morris Heights, New York City

DECK CANVAS-ALL WIDTHS

YACHT SAILS-AWNINGS-SPRAY HOODS - Etc.

522 So. Delaware Ave Philadelphia GEO. R. BURROWS, Inc. 2 South St New York

FINISHED CRANK SHAFTS

P. H. Gill & Sons Forge and Machine Works, Brooklyn, N. Y.

We are furnishing them to some of the leading marine engine builders. Carbon and Alloy Steel, Heat Treated to your own specifications. We grind all Pins and Bearings. Forged, machined, and finished complete in our own plant. Let us quote you.

ZUNDEL

Burns denatured alcohol. Width 20 in. Depth 15 in. Height to top of tank 9 in. Price $17.50.

Burned Gas Compressor for storing whistle tanks. Model "O" Price $10.75.

6-volt Marine Horn. 9 in. high, 4 in. wide at base, weighs 2¾ lbs. Price $9.50.

R. W. ZUNDEL COMPANY, Inc.
47 Whitehall St.—Phone Bowling Green 9157—New York, N. Y.

BOAT SUPPLIES

More Speed Guaranteed

Let us increase your boat speed with a

B & B Propeller

We are so sure that the celebrated B & B Propeller will make your boat go faster that we positively guarantee it to increase your speed from one to three miles per hour.

Excellent materials and workmanship together with scientific design is the reason for the wonderful efficiency of B & B Propellers. They are different.

Any size and pitch up to 30" dia. in stock.

Write Today for Catalog

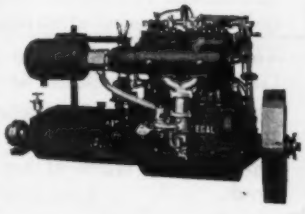
BRYANT & BERRY PROPELLER CO.,
1212 Lillibridge St., Detroit, Mich.

New York Representatives: E. J. Willis Co., 85 Chambers St.

REGAL

—FOUR CYCLE— MARINE ENGINES

FOR twenty-one years have led the field in the design and construction of reliable and economical power plants. Sizes 2 h.p. to 50 h.p. One to four cylinder. Built to operate with gasoline distillate or kerosene.



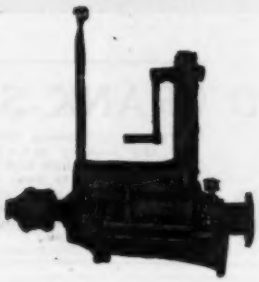
REGALITE—the new Electric Lighting Plant, 2 h.p. air cooled motor, ¼ k.w. generator. Write for information.

REGAL GASOLINE ENGINE CO.

74 West Pearl Street COLDWATER, MICH.

Clutch, Reverse Gear *and* Rear Starter All In One Unit

SYRACUSE REVERSE GEAR



The Syracuse is the most complete reverse gear on the market today. It has every essential feature you can find in any other gear. Beyond this it has exclusive features found in no other gear.

In addition to the usual clutch and reverse mechanism, the Syracuse includes a high grade rear starter built in as an integral part of the gear. This makes a neat compact unit that takes less room in your boat and is particularly practical because it is attractive in appearance, convenient to operate and so simple that it requires no special attention or adjustment.

The all enclosed, silent and clean Syracuse Gear is now available at prices reduced 20%.

The high standard of efficiency and workmanship in this gear remains the same. We also supply open types of reverse gears when desired.

The Syracuse Gear is made in sizes from 10 H. P. to 100 H. P. It is suited to service in any boat with any engine up to 100 H. P. In fact we specialize in gears for high speed motors such as the Hall-Scott 100 H. P., etc.

Catalogue and Prices on Request

SYRACUSE GEAR CO.

SYRACUSE, N. Y.

The Mystery of the Screw Propeller

(*Continued from page* 178)

understand some of the results. Everyone who has rowed a boat is familiar with the little spiral vortices which form at the end of an oar when it is lifted from the water. These may be observed to maintain their shape for some distance behind the boat. The same thing can be observed at the tips of the propeller blades, and these little vortices running off the tips of the blades have actually been photographed for air propellers. The cause of these vortices is a circulation flow around the blade, and this circulation is the characteristic feature of the modern theory of propeller action.

The study of this circulation flow around the blade has resulted in establishing a very important principle, which states that with a circulation flow around the blade, the resultant thrust on the propeller is at right angles to the direction of fluid flow ahead of the propeller. It therefore explains fully what the impact theory could not, namely, why the thrust is greatest when the relative flow is practically tangent to the pressure face of the propeller blade.

Propeller action is therefore no longer a mystery but is firmly established on a rational basis. Within the last few years the circulation theory has been reduced to a practical working basis, and can now be readily applied to the design of propellers as well as to the analysis of their performance. Perhaps the chief feature of this new method is that it enables the designer to lay out a propeller to satisfy any given set of conditions with assurance that the predicted performance of the propeller will not differ materially from actual results obtained in service. It also makes it possible to analyze propeller performance and determine what changes in design will better the efficiency of existing types, as well as to develop a new type which shall fulfill the conditions for maximum efficiency. The new method of propeller design should therefore be of great interest to motor boatmen, as refinements in detail of hull and engine design are far in advance of propeller construction and performance.

The Journey's End

(*Continued from page* 168)

in the fitful periods of sunshine which break through the August rain clouds, in painting deck and cabin, and in placing equipment in dry storage. Then when Hippocampus was stripped of everything portable her energetic little motor snorted for the last time and chugged her to a mooring off the lighthouse depot. There she rests, saucy and trim as when she first took the water, awaiting my return in June. While three thousand miles of her native element separate her from me, she is brought constantly to the foreground of my mind by the written assurances of my Canal Zone friends that "Hippo is O. K."

So also are the resourceful, energetic and companionable shipmates who helped me sail her to the Zone. Both Squibb and Chambers, responding to the lure of tropical life, have turned their backs on the winds and vicissitudes of northern existence.

Squibb, again a landsman, but with the firmly established reputation of a sea dog, is surveying for an oil company in the Colombian jungle. Chambers, always the rover and the adventurer, has cast his lot with our engineering friend Davidson, and at last accounts was heading for the upwaters of a great South American river, there to search for gold and diamonds.

Hippocampus owes them much, but when I last saw her pirouetting at her mooring she wore the righteous air of one who gives as good as she receives.

The Way We Would Do It

(*Continued from page* 43)

It is apparent that your rudder needs to have some of its blade area forward of the rudder stock. In your case this can be very easily done by punching out the rivets which hold it in place. The blade should simply be moved and refastened so that about twenty per cent of its area will be forward of the rudder stock. We would suggest that about three inches of the blade be allowed to project forward and that the blade be then re-riveted into place. The total area of the blade is sufficient and relocating it as suggested will tend to make the boat turn better with less strain on the steering gear and tiller lines.

Advertising Index will be found on page 192

CHAS. CORY & SON, Inc.

CORY SAFETY SERVICE

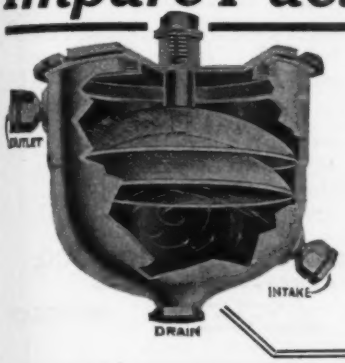
183-7 VARICK ST. NEW YORK, N. Y.

YACHT & POWERBOAT EQUIPMENT

Mechanical Telegraphs	Rudder Indicators	Signalling Lights
Telephones	Gongs, Bells	Signalling Sets
Voice Tube Fittings	Lighting Fixtures	Howlers
Annunciators	Wiring Appliances	Fire Extinguishers
Electrical Telegraphs	Running Light Panels	Fire Alarms
Shaft Indicators	Running Lights	Ramsay Anticipating Governor
Whistle Control	Switchboards	

WRITE FOR FURTHER INFORMATION & CATALOG BULLETIN

Impure Fuel Due to Water! KLEENGAS PURIFIER



Fully 90% of your carburetor trouble is caused by water and dirt in your fuel. You can prevent this trouble entirely with a KLEENGAS PURIFIER.

You can't prevent water from collecting in your fuel tank and line—it condenses from damp atmosphere as well as the water in the gas or kerosene you buy. You can't prevent sediment, dirt, fluff, rust, impurities—some scales off the tank lining—some comes in the gasoline itself. But you can prevent all the troubles caused by these impurities.

KLEENGAS is a high grade PURIFIER scientifically designed, simple in construction and made of the best non-corrosive materials. Aluminum bowl, double parabolic fine mesh bronze screens, brass drain tap at bottom. It cleans itself by the swirling motion, the impurities dropping down so they don't clog the screen. Large capacity allows full gas flow and requires only occasional draining.

Order a KLEENGAS today—$10.00 postpaid. Money cheerfully refunded if not as guaranteed. Hundreds in use. Easily installed—no soldering.

Excellent proposition for distributors and dealers—write

THE NATIONAL AUTOMOTIVE MFG. CO.

822 CHAMPLAIN AVE., N. W. - - - CLEVELAND, O.

DON'T BUY A BOAT

Until You Have Seen Our Exhibit of Motor Boats, Sail Boats, Row Boats, and Especially Our One Design Class Baby Knockabout, on Exhibit at the New York Motor Boat Show, Grand Central Palace, New York City, February 17-25, 1922.

MEMBER NATIONAL ASSOCIATION OF ENGINE & BOAT MANUFACTURERS

CAPE COD SHIP BUILDING CORP.

SUCCESSORS TO

CAPE COD POWER DORY CO.

WAREHAM, MASS.

Builders of Standardized Boats and Craft Up to 150' Lengths on Order

Export Office: Sprague & Duckett 342 Madison Avenue, New York City, N. Y.

New York Showrooms: 412 Eighth Ave.

BEEBEE BOATS

SPECIAL HIGH SPEED RUNABOUTS AND HYDROPLANES

16 foot 5 passenger runabout or yacht tender, speed 40 M.P.H.

36 foot 10 passenger sporting runabout, 75 M. P. H.

Hydroplanes 80-90 or 100 M.P.H.

WORKMANSHIP, SPEED AND PERFORMANCE GUARANTEED

SYDNEY C. McLOUTH

MARINE CITY MICHIGAN

WE SHIP THE DAY
WE RECEIVE YOUR ORDER

MARINE JOINTS

MUST BE USED

On all angular drives.

SHOULD BE USED

On all straight-line drives when there is a possibility of future disalignment.

BEST BE USED

On all drives to avoid waste of power, constant checking of alignment, or both.

Blood-Brothers Model B joint is rugged and compact.

It has larger bearing capacity and will turn in a smaller circle than others.

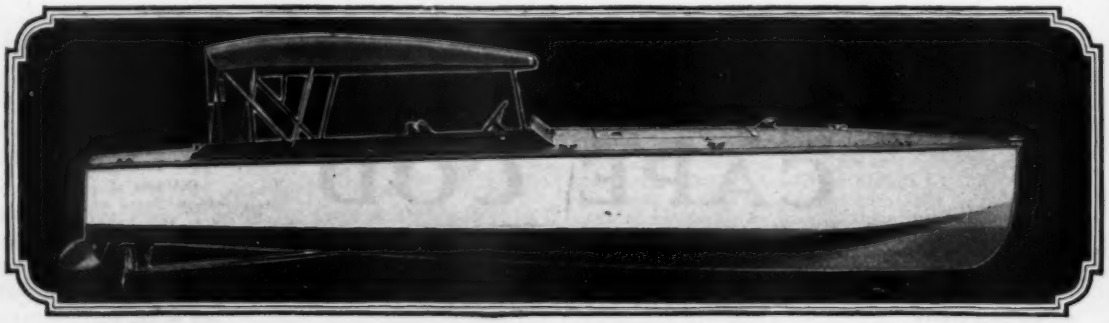
It is easily lubricated through a single opening.

It does not throw oil and requires infrequent lubrication.

Made in four standard sizes.

Send for marine bulletin; it will interest you.

BLOOD-BROTHERS MACHINE CO.
Pioneer Builders of Universal Joints
ALLEGAN — F. Somers Peterson, San Francisco, Calif., Western Representative — MICHIGAN



Mullins "V" Bottom Boat — Keeps an Even Keel

No matter what the speed—regardless of how choppy the sea, Mullins newest "V" Bottom steel boat keeps an ever even keel. Will not roll or upset.

Developing more speed per H.P., remaining drier when under way and being steadier to pilot, the "V" bottom boat has many advantages over a round bottom boat. Lighter in draft, the "V" bottom is in less danger from shoals and shallows.

Mullins boats are safe as life boats—air compartments, fore and aft, insure permanent buoyancy. The steel hull retains its shape and remains smooth. Cannot spring a leak—no seams to open. No calking necessary. Can't warp, dry out, rot or waterlog. No boathouse needed. The upkeep is low. Powered with the finest marine motors.

MULLINS STEEL BOATS CAN'T SINK

Mullins boats are designed and built in the world's largest boat factory. Known and used for 26 years on the waterways of all nations. Over 50,000 now in service.

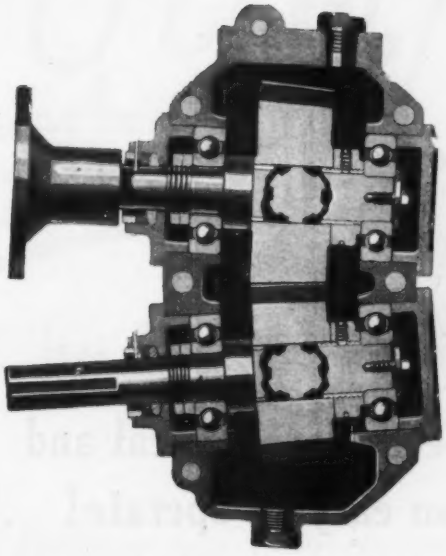
Write for complete description of the Mullins "V" bottom boat. On request, we will mail new catalog, showing many models of power boats, rowboats and canoes.

THE MULLINS BODY CORPORATION
Boat Department
644 Depot Street — Salem, Ohio

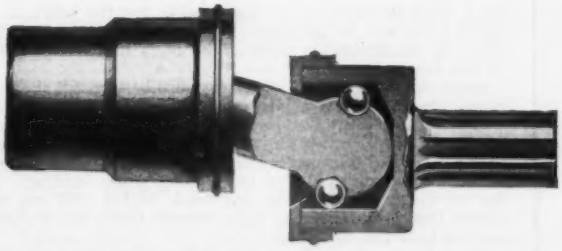
Advertising Index will be found on page 192

Gear Boxes

For Racing Hydros and High Class Runabouts



Ball bearing throughout. Generated Teeth. Greatest Efficiency. Sizes up to 1000 H.P. and 2000 R.P.M. Either angular or straight.



CROSS, 99% efficient, Ball Bearing Universal Joints. The smallest diameter joint on the market. Made in a variety of combinations and sizes to transmit 1000 H.P. at any motor speed.

CROSS Reverse Gears for all high speed, high power motors.

These articles of equipment are used and recommended by the best builders in the country.

Write us about your installation problems. We can solve them for you.

Cross Gear & Engine Company

3255 Bellevue Avenue Detroit, Mich.

Note the simplicity of the L-A Rowboat Motor—note its sturdiness. Here is a man's motor—heavy enough to be strong and durable, light enough to be easily transported

Speedy, economical and so easy to operate!

SPEED that gets you there and back in a jiffy—6 to 8 miles per hour on an ordinary rowboat.

Economy in gas consumption—at least 12 miles to the gallon of gas.

Simplicity of operation—you don't need to be a mechanic to run the L-A.

Reliability—strong and sturdy, and always dependable.

These are the features which give the L-A Rowboat Motor its popularity with vacationists, picnickers, fishermen and hunters. For the L-A Rowboat Motor is built to give *service*—and to the recreationist and amateur sportsman service means *speed* and *economy*, *simplicity* and *reliability*.

If you are not posted on all the merits of the L-A Rowboat Motor write for full information today.

Learn why the L-A is rudder-steered, why it has a built-in gas tank, why its magneto is so powerful. Write for the facts today—you'll be glad to know the L-A Rowboat Motor better.

LOCKWOOD-ASH MOTOR CO.

2207 Jackson St. Jackson, Mich.

LOCKWOOD-ASH

MARINE LA ENGINES

Removable Spray Guard

(*Continued from page* 41)

cabin top, but flat on the upper side, was screwed to the deck just forward of the bulkhead and the windshield frame attached to this by means of two or three heavy strip brass clips and brass bolts and nuts.

Two braces made of three-eights-inch galvanized rod were fastened to the forward edges of the frame and extended down to the deck. Here two brass plates were screwed on, the rod ends being threaded, and attached, by means of brass machine screws, to two similar plates screwed to the deck. The machine screws were screwed into the fixed plates and slots in the upper plates permitted of quick removal after slightly loosening the screws.

H. H. P., Oakland, Cal.

Hauling Out Made Easy

(*Continued from page* 42)

casters make the rig suitable for heavier boats and more of them.

As the size and number of boats increases a rig approaching the large marine railway is necessary. Smaller car wheels may be purchased separately or shrunk on axles as desired, and most any discarded trolley rails or industrial rails will be suitable. These may be purchased from dealers in used construction equipment, or, perhaps, picked up around the junk yard. The wheels integral with the axles are preferable for a number of reasons. The car construction is simpler and the car is not as apt to jump the track. The axle is not apt to bend under a heavy load, and the wheels, being fast, cannot wobble and rub against the side of the car, as is the case with loose wheels.

A car 20 feet long will handle easily boats up to 35 feet. For this size boat the sides should not be smaller than 6 by 6 inches, of yellow pine or spruce. The wheels run inside the stringers, which should be spaced accordingly by pieces of the same timber, at the center and 18 inches from each end. End spreaders are mortised and tenoned and the center bolted. Alongside each spacer bore the stringers and place rod threaded at each end to hold the frame securely together, and cross brace each section with angle iron, pipe, or wood. Over each end spacer bolt a 4 by 6 inch piece 10 feet long upon which to slide the chocks.

The chocks are made of 3 by 6 inch stock to conform generally to the underbody of the boats, and are held on their bearing timbers by bolts through plates at the high end, guide plates at the other. Ordinarily only two chocks on the after bearing piece will be needed. Chocks are adjustable.

To attach the wheels, bolt on just inside the spreaders, babbited shaft bearings, of a size suitable for the journals. Hardwood bolts will be all right, but they run harder. Where the water is exceptionally shallow the bolts may be placed on top of the frame.

Bore the ends of the stringers, or, better still, bolt on iron plates, for attaching a chain bridle for hauling on. This car will require several hundred pounds of ballast to overcome its buoyancy. Lay pieces of old rail, shafting, etc., across it or board over the bottom and fill with stone or scrap iron. The additional weight will not be noticed when hauling. Friction due to faulty construction and track laying will use up more power than is required to haul several times the weight necessary to hold the car down.

Start laying the rails at low tide, and as they are spiked to the ties and the ties cross braced with old lumber to prevent twisting until the ties have settled in the bottom, push them out and continue laying for required distance. A six by six across the top of the rails at the outer end will prevent the car from going too far. The rails must be carefully spaced so that the wheel flanges will not bind or the wheels jump the track. Lay the track straight and true down the bank to avoid a steep haul. Old trolley rails will be found to give good service, and owing to their weight will sink the ties so that there will be no shifting of the track. For track above high water 3 by 4 inch timber with ¼ inch by 3 inch flat iron strips screwed to them to prevent wear and allow easy running may be used.

W. B. M., Newburgh, N. Y.

Gar Jr. As An Ice Breaker

(*Continued from page* 174)

ready had. So we carried these back to where Gar Jr. was held fast in the ice and proceeded to reinforce the plow we had used the day before.

Some of the illustrations will show the breaker. It worked to perfection. At first we ran slow, then faster, and then still faster. Soon we were hitting better than 25 miles per hour and running through an ice field which one minute was a solid sheet and the next was an ice storm, showered down upon the waters of the canal, astern of our course. Had it been raining ice the effect could not have been more realistic. The four miles took about eight minutes and then Gar Jr. was locked down into the waters of the Delaware and passed away from the ice of the cold north, and to the beginning of the waters of perpetual sunshine.

Advertising Index will be found on page 192

1922

A Strictly Designed Marine Motor
10 to 25 H. P.

Gray

VALVE-IN-HEAD MOTOR

The Motor News of 1922 —

Better in every detail—Better as a whole—

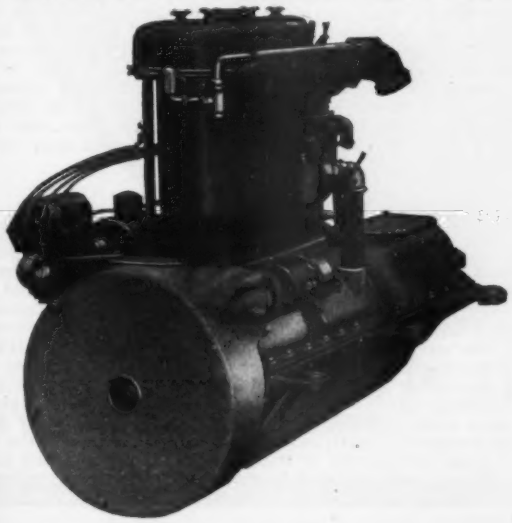
THE 1922 Gray is neat in appearance, compact, and can easily and inexpensively be installed in runabouts 20 to 30 ft. in length; small cruisers up to 34 ft., also work boats. Note the rigid one-piece base with reverse Gear enclosed.

The Gear is automatically lubricated with positive gear pump that lubricates all other internal working parts of the engine—no grease cups or thick transmission oil used.

Oil filler is conveniently located on top of engine with duct leading to Crank Case. Rocker arm shaft is hollow and automatically supplies oil to Rocker Arms. Oil is forced under pressure to the three main bearings, and to the connecting rod troughs.

In brief, the Gray Oiling System leaves nothing to chance. It is unfailing at all engine speeds, and all oil is kept inside the engine, and not thrown around the boat or on its occupants.

The fly wheel is enclosed, affording *safety* and *cleanliness.* Bilge water cannot be thrown by the fly wheel. Every working part is enclosed; even the push rods. Due to the special design of the Cam Shaft, push rods and rocker arms, scarcely a sound can be heard with the ear close to the engine.



Its smooth, quiet operation at all speeds from 200 to 2000 would compare favorably to an electric motor.

This Gray Improved Valve-in-Head operates most economically on the low grade gasoline and satisfactorily on kerosene.

The diameter of the main bearings are:

Front 2⅛". Center 2 1/16". Rear 2". The lengths are 3⅜", 2½", 2½" respectively.

Crank Shaft is 40-50 point carbon steel forging, heat treated and ground.

Special attention is given to the balancing.

The shaft is put in rotative as well as static balance on an Akimoff Dynamic Balance Machine, reducing vibration to a minimum.

Bosch Magneto with Impulse Starter, also Bosch two unit Starter and Generator is used.

Gray Two-Cycle Motors are built in models from 3 to 8 h.p.

Write for FREE literature

Gray Motor Corporation

2106 Mack Ave. DETROIT, MICH.

The Belle Isle

Bearcat

America's Finest Runabout

Will be on exhibit at the New York Motor Boat Show.

BE sure to attend and let us show you the many superior features of these famous runabouts that have set a new standard for Motor Boats during the past year.

Our exhibit will include other models of

BELLE ISLE BOATS

ranging in price from $250.00 up.

BELLE ISLE BOAT & ENGINE COMPANY

DETROIT, MICHIGAN

Builders of the "Davis American Dingheys."

Yard and Shop

(*Continued from page* 64)

New Yacht Club Building

The Capital Yacht Club at Washington, D. C., has appointed a committee to formulate plans for the acquisition of a site on the water front at the foot of Eleventh Street, S. W., on which it is planned to errect a new club house. It is also contemplated to install a complete marine railway here for the benefit and convenience of the club members.

Commodore Gar Wood Reelected

Commodore Garfield A. Wood, national and international motor boat champion, was re-elected commodore of the Detroit Yacht Club, at the annual meeting, on Jan. 9. The attendance at the meeting set a new record for the club, more than 500 out of the 2,084 members in good standing turning out.

While the D. Y. C. is world famous for its power boats the directors' proposals regarding the sailing activities in 1922 met with the approval of the membership. The Cat Boat committee requested not less than three and five new cat boats if possible be purchased. The directors announced the authorization of 10 new cats, giving the club the largest fleet of club owned cats on the Great Lakes, a total of 26, in addition to the numerous privately owned boats in the fleet.

Commodore A. A. Schantz, chairman of the building committee, reported that the contracts for the new $500,000 club house, on the new island off the Belle Isle shore, had been let and that the new club house would be opened in the spring of 1923. He also announced that the 500 foot veranda would be ready in the fall for the members to use as a grandstand to view the Gold Cup and Harmsworth Trophy races.

Commodore R. W. Rennie, as treasurer, showed that the club was more prosperous than ever in its history having cash assets of $312,000. A plan for a sliding scale of initiation fees for the next 1000 members was approved. The first 200 pay $250 and this is increased $50 for every 200, which will provide a sufficient fund to complete the club house without selling additional bonds to the membership.

In the election of flag officers, Rear-Commodore George H. Voelkner was re-elected. Vice-Commodore C. D. Cutting, Treasurer Commodore R. W. Rennie and Secretary William J. Fuehrer, were re-elected. Dr. C. S. Ratigan was elected fleet surgeon and L K. Wood fleet measurer.

Palmer Brothers New York Office Moves

On and after February 1st the New York show room of Palmer Brothers Engines, Inc., will be located at 128 Lexington Avenue between 28th and 29th Streets. E. E. Palmer will be in charge as usual and will be assisted by Gustaf Blomgren who has been connected with Palmer Brothers for the past fifteen years. A complete line of sample Palmer motors will be shown and a complete stock of parts and supplies used with Palmer motors will be always on hand.

Sexton Motor Company Expands

In order to meet the demand for Enterprise Diesel and heavy duty marine engines in the vicinity of Washington, D. C., the Sexton Motor Company have been compelled to establish a branch in Washington which will be located in Suite 322 and 323 Star Building. This branch will be under the direct charge of Horace Ward, well known in the capital marine circles, and who is to act as Branch manager. The Enterprise motors will be introduced to the many government departments which have use for this type of machinery. The Sexton Motor Company further have arranged to distribute the marine motors built by the J. V. B. Engine Company of Akron, Ohio, in the territory of New York and Philadelphia. The business of the New York office will be carried on from 30 Church Street, New York.

Scripps Prices Dropped

Although the prices of Scripps motors had perhaps reached as low a figure as was consistent with production costs, the Scripps Motor Company of Detroit announces a drastic business revival policy. The public has delayed its purchases in every line of business on the excuse that prices are coming down. In order to kill this alibi the present D series of motors in two, four and six cylinder sizes, all with bore and stroke of 4¼ by 6 inches, have been cut in price to a new low point. The prices as announced for these will be for the two cylinder motor, $650.00; for the four cylinder, $1100.00, and for the six cylinder, $1500.00. This cost covers the motors complete with a two unit starting and lighting system, storage battery, magneto ignition and enclosed reverse gear.

The Gray Stock Cruiser Launched

The first of the Gray standardized cruisers was completed and launched on the afternoon of January 9th. In order to get the boat to the water it was necessary to cut through four inches of ice and clear a channel for the marine railway. In starting the Knox motor for a trial trip it was only necessary to turn it a few times before it started and ran well for several hours. Considering that the machine had been standing idle for five months this is very creditable. Trials were run against a good stiff breeze and tide while towing the small dinghy astern and a speed of 9.78 miles per hour was made while with the wind and tide the speed was 10.6 miles per hour.

New Boats Being Built

Down at Middletown, Conn., in the local boat building yard, are being constructed three new 36-foot express cruisers from the design of Claire which was published in MoToR BoatinG in the series by Wm. H. Hand, Jr. These boats are practically identical with the express cruiser Harpoon, owned by M. S. Cornell, Jr. They are being built as a result of the demonstrated success of Harpoon and their new owners, L. M. Brooks of Chester, Conn., L. P. Racke of Naugatuck, Conn., and Carlton E. Palmer of New York, will be well pleased with their performance.

Navigation Classes in New Haven

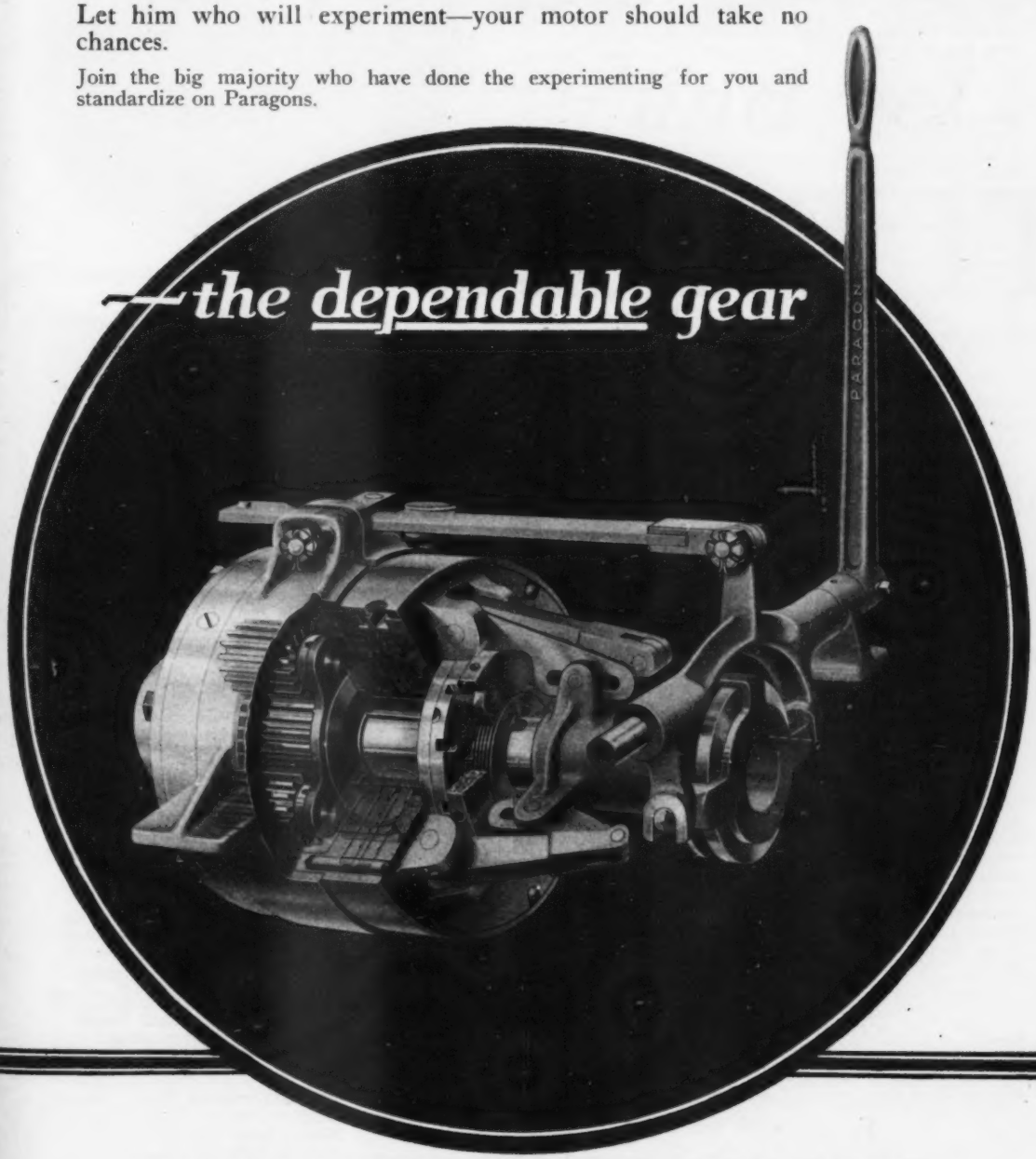
The Waucoma Yacht Club in New Haven is arranging a series of instruction classes covering the essential points of rules of the road, lights, whistles, the compass, and other kindred topics. These classes meet after the regular meeting on Tuesdays of each week and are under the care of Secretary Cooper. On Friday evenings Prof. Crum gives two hours of practical talks on the gasoline engine, and Jim can put over the problems so that a school boy can understand them. Diagrams are drawn and questions asked, answered, and discussed. Marine engines are taken down, refitted, and rebuilt. The Commodore of the club has extended a hearty invitation to all boat owners in the vicinity to enjoy the benefits of these classes. Other activities essential to a successful yacht club are also in full swing, among them a racing program which contemplates a number of interesting races.

PARAGON REVERSE GEARS

YOU who have seen marine motors and accessories come and go during the last decade will appreciate the time-tried *dependability* of the Paragon Reverse Gear.

Let him who will experiment—your motor should take no chances.

Join the big majority who have done the experimenting for you and standardize on Paragons.



PARAGON GEAR WORKS

CUSHMAN STREET, TAUNTON, MASS., U. S. A.

MoToR BoatinG Advertising Index

A

A. C. Electrical Mfg. Co. 179
Allison Engineering Co. 73-74-75-76
American Bosch Magneto Corp. 103
American Brass Co. 86-87
American Strombos Co., Inc. 182
Auto Engine Works 152

B

Barker Factory, The 179
Belle Isle Boat & Engine Co. 190
Bissell Varnish Co. 169
Blood Bros. Machine Co. 186
Bosch Magneto Corp., Robert 89
Bowes, Thos. D. 64
Brennan Motor Mfg. Co. 158
Brooks Mfg. Co. 181
Brooklyn Varnish Mfg. Co. 108
Bruns, Kimball & Co., Inc. 61
Bryant & Berry Propeller Co. 183
Buffalo Gasolene Motor Co. 1
Burger Boat Co. 114
Burrows, Geo. R., Inc. 183

C

Caille Perfection Motor Co. 110
Caldwell & Co., J. E. 68
Cape Cod Shipbuilding Corp. 185
Carlisle & Finch Co., The 181
Carlyle Johnson Machine Co. 179
Carpenter & Co., Inc., Geo. B. 84
Clark Turner Piston Co. 103
Clay Engine Mfg. Co. 124-125
Classified Advertisements 59-60-62
Coes Wrench Co. 116-117
Columbian Bronze Corp. 157
Comet Electric Co. 130
Consolidated Shipbuilding Corp. ..4th Cover
Cory & Sons, Chas. 185
Cox & Stevens. 52-53-64
Crescent Motor Boat Co. 66
Crockett Co., D. B. 179
Cross Gear & Engine Co. 187
Curtiss Co., J. H. 182

D

Dawn Boat & Shipbldg. Corp. 138
Defoe Boat & Motor Wks. 179
Delanco Shipbldg. Corp. 119-120-121-122
Densmore Co., J. M. 127
Devoe & Raynolds Co., Inc. 181
Disappearing Propeller Boat Co. 163
Dobson, B. T. 64
Doman, H. C. 153
Donnelly, William T. 138

E

Elco Co. .....2nd Cover
Elgin Nation Watch Co. 4
Elto Outboard Motor Co. 169
Evinrude Motor Co. 67

F

Fay & Bowen Engine Co. 194
Ferdinand & Co., L. W. 164-165
First National Co., The 66
Fisher, Carl G. 65
Frishie Motor Co. 159-160-161-162
Fuel Oil Motors Corp. 118

G

Gardner & Co., Wm. 57
Gielow, Henry J. 54
Gill & Sons Forge & Mach. Wks., P. H. 183
Gordon Propeller & Mfg. Co. 182
Gray-Aldrich 181
Gray Boats, The 179
Gray Motor Corp. 189
Great Lakes Boat Building Corp. 12
Grebe & Co., Henry C. 58

H

Hacker Boat Co., John L. 175
Haddock, R. M. 57-64
Hall-Scott Motor Car Co. 82-83
Hamilton Marine Eng. Exchange, Inc. 62
Hand, Jr., Wm. H. 64
Harrison Boat Works, R. W. 179
Harvey Marine Motor Co. 166
Hebgen, A. G. 182
Hess Motor Co. 134
Hyde Windlass Co. 181

J

J. V. B. Engine Co. 107
Janney, Steinmetz & Co. 174
Jennings Co., H. H. 56
Jones, Frank Bowne 56
Johnson Motor Co. 6

K

Kermath Mfg. Co. 139-140-141-142
Kirby, George, Jr., Paint Co. 129
Knox Motors Associates 167
Koven & Bro., L. O. 181

L

Leemon Boat Co. 131
Lockwood-Ash Motor Co. 156-188
Lord, Frederick K. 64
Luders Marine Construction Co. 182
Lunkenheimer Co., The 126

M

McFarland Foundry & Machine Co. ... 170
McKinnon Iron Works Co. 96
McLouth, Sidney C. 185
Marine Wheel Co. 2
Masten Co., Inc., G. H. 182
Masters & Co., W. L. 63
Mathis Yacht Building Co. 174
Michigan Marine Motor Corp. 137
Mower, Chas. D. 64
Mullins Body Corp. 186

N

National Carbon Co. 11
Nat'l Assn. of Engine & Boat Mfg. 170
National Automotive Mfg. Co. 185
Naval Architects & Yacht Brokers. 64
New London Ship & Engine Co. 171
New York Yacht, Launch & Engine Co. 183
Niagara Motors Corp. 146
Nock, Frederick S. 64-135

O

Oberdorfer Brass Co., M. L. 179

P

Palmer Bros., Engine, Inc. 94-95
Paragon Gear Works. 3-85-147-191
Pierce, J. H. 132
Piston Ring Co., The 109
Peerless Marine Motor Co. 155
Prentiss-Wabers Stove Co. 90-91
Purdy Boat Co. 81

R

Racine Boat Co 181
Rajah Auto Supply Co. 93
Red Wing Motor Co. 148
Regal Gasoline Engine Co. 183
Richardson Boat Co. 145
Ritchie & Sons Co. 158

S

Sanford, H. W. 58
Scripps Motor Co. 173
Schellenberg, B., & Sons. 92
Sea Sled Co. 69-70-71-72
Seth Thomas Clock Co. 154
Simms Magneto Co. 158
Skaneateles Boat & Canoe Co. 136
Snow & Petrelli Mfg. Co. 177
Southern Cypress Mfrs. Assn. 111
Southland Steamship Co. (Lebby Products Division) 182
Sponagle, C. S. 64
Spinaway Boat Motor Co. 115
Standard Gear Co. 77-78-79-80
Standard Motor Construction Co., 2d Cover-97-98
Stearns-McKay Mfg. Co. 68
Stearns, Frank B. 62
Stearns Motor Mfg. Co. 99-100-101-102
Sterling Engine Co. 3rd Cover-123
St. Lawrence Boat Works. 128
Syracuse Gear Co. 184

T

Tams & King 55
Thompson Bros. Boat Mfg. Co. 181
Tiebout, W. & J. 133
Tvedt-Smith Co. 106

U

Ultra Six Marine Motor Co. 88
Universal Motor Co. 112-113
Universal Products Co. 153

V

Valentine & Co. 51
Vibration Specialty Co. 143

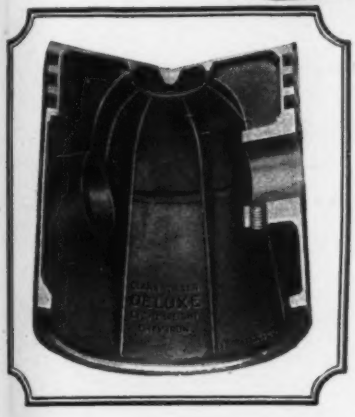
W

Wilcox, Crittenden & Co. 104-105-152
Willis Co., E. J. 149
Winton Engine Co. 151
Winslow, Ralph E. 64
Wisconsin Motor Mfg. Co. 7-8-9-10
Woolsey Paint & Color Works, C. A. ... 182

Z

Zundel Co., Inc., R. W. 183

"It Can't Be Done," – and yet WE DO IT



More Truth Than Poetry

The oil and gas
You've bought and lost
Would more than pay
The DELUXE cost.

Science again achieves the "Impossible"

When they first saw a DELUXE piston with its scientific reinforcing ribs, most engineers admitted its manifest superiority over all other pistons, but they said "Commercially, it can't be done."

And yet,—we do it. Because of scientific foundry and machine shop practice, **nearly one** million DELUXE pistons, sold not only at a reasonable, but at a low price, have made good under the most strenuous conditions.

The scientific reinforcing ribs make DELUXE pistons stronger where strength is needed and 40 to 50% lighter than stock factory cast pistons.

DELUXE pistons have less expansion, greater cooling surface and can be fitted closer than other pistons.

They eliminate oil pumping, piston slap and vibration. They save gas, oil, repairs and depreciation. They make old motors like new, and new ones better.

DELUXE pistons increase power, speed and flexibility.

We are telling motorists the truth when we say that *every* motor, old or new, needs DELUXE pistons. Why not cash in on the record DELUXE pistons have made and will make?

DELUXE pistons are made for over 1,400 different types of internal combustion engines and in all sizes and over-sizes, so you can handle any job that comes in,—at a good profit. And you can get DELUXE pistons on 24-hour notice or less.

Ask us for details or write our nearest distributor, listed in Chilton's Automobile Trade Directory, The (Red) Automobile Trade Directory or Might's Canadian Automotive Directory.

All good things are imitated, but look inside for the name "DELUXE." It is there for your protection.

DELUXE pistons and coreboxes for making the same are thoroughly protected by U. S. and foreign patents. We intend to vigorously defend our rights and prosecute all infringers.

DELUXE
LIGHT WEIGHT CAST IRON PISTON
The Successful Light Weight Piston ©

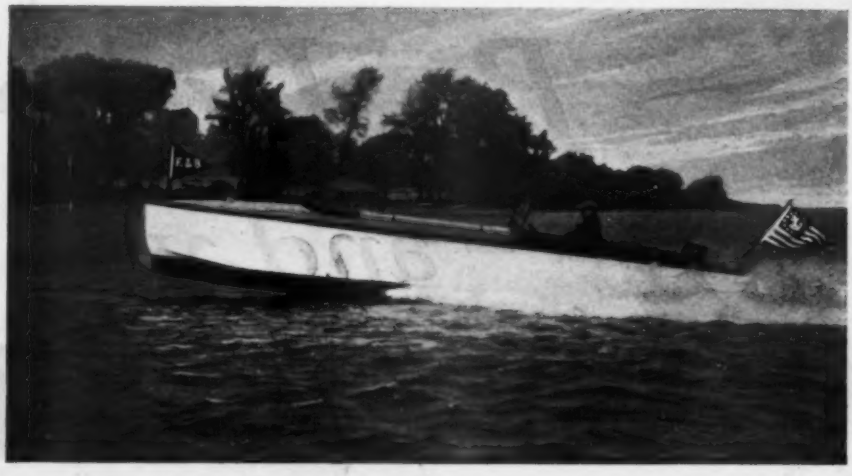
Patented and Manufactured by

Clark-Turner Piston Company

INCORPORATED

Los Angeles, California

COME and SEE



25-Foot Fay & Bowen Sport Model

We will exhibit at the

NATIONAL MOTOR BOAT SHOW

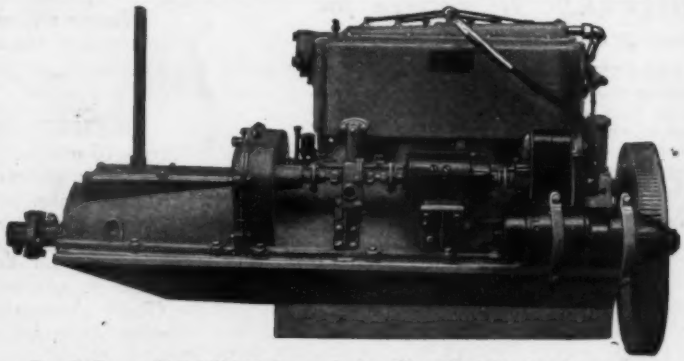
at Grand Central Palace, New York City, Feb. 17th to 25th, the following boats and engines:

Boats

Name of Boat	Length	Beam	Draft	Power Model	Power H. P.	Speed M.P.H.	Type of Boat
Junior Runabout	24′ 0″	5′ 0″	20″	LN-41	22	16	Round bilge
Sport Model	25′ 0″	5′ 4″	25″	LNS-43	50	23	V-bottom
27′ Runabout	27′ 0″	5′ 3″	22″	LN-42	40	19	Round bilge

Engines

Model Number	Bore	Stroke	H. P.	No. of Cylinders
LN-41	3½″	4½″	22	4
LN-42	4¼″	5½″	40	4
LN-43	4¾″	5½″	40	4
L-44	5″	6¼″	45	4
L-63	4½″	5½″	50	6
L-64	5″	6¼″	85	6



Fay & Bowen Model LN-42 four cylinder 4¼ x 5½ with electric starter

RELIABILITY F&B

FAY & BOWEN ENGINE COMPANY

104 LAKE STREET, GENEVA, N. Y., U. S. A.

NEW YORK: 44 Third Ave. at 10th St., Sutter Bros., Representatives
PHILADELPHIA: 116 Walnut St., Marine Equipment & Supply Co., Representatives
BOSTON: 84 Atlantic Ave., Gray-Aldrich Co., Representatives

Advertising Index will be found on page 192